CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

APRIL 1, 1995
SEVEN DOLLARS

BELGIUM BF260
FRANCE Fr43
GERMANY DM13
ITALY L12,500
JAPAN ¥800
NETHERLANDS G14
SPAIN P1000
SWITZERLAND SFr11
UNITED KINGDOM £5

Call for Entries

Enterprise Value Awards

CIO'S ENTERPRISE VALUE AWARD GETS YOU ALL THREE.

DEADLINE: JULY 1, 1995

Step into the Spotlight

Enterprise Value Awards SM

The Award for Innovative IT Solutions

THE VALUE OF IT. It's real. You know it and you've proven it. Your organization is actually realizing business value and hard-dollar benefits from information technology systems. And you were the champion, the architect, the strategist. We want to recognize and honor your contribution to the enterprise.

So CIO created the Enterprise Value Awards to honor those executives using innovative IT solutions to bring about real business value.

DO YOU QUALIFY FOR AN ENTERPRISE VALUE AWARD? THREE CRITERIA ARE ESSENTIAL...

1. The pervasiveness of information technology—in other words, the strategic objective could not have been met without IT's contribution
2. A return of value to the enterprise (see Defining Value within the application form)
3. A partnership between an IT and business executive

WHAT DO WE MEAN BY VALUE?

When many think of value, they think of Return-on-Investment, commonly referred to as ROI. And while ROI will certainly be a key factor for determining Enterprise Value Award winners, value can also be derived from systems that:

- enable new, innovative and more productive ways of doing business
- enable revamped organizational structures or styles of performing the work of the enterprise
- enable the enterprise to enter a new market
- enable global expansion
- transform the way the enterprise competes within its customary market or that alter the terms of competition in the market
- improve the enterprise's relationships with its customers
- improve the enterprise's relationships with its own employees or functions
- help the enterprise compete more effectively by adding to the sum of its available knowledge assets
- enable leaner and more economical operations

The February 1, 1996 issue of *CIO* will feature profiles of the winning organizations and the executives who have proven their strategic technology solutions have had a positive and sustained impact on the enterprise.

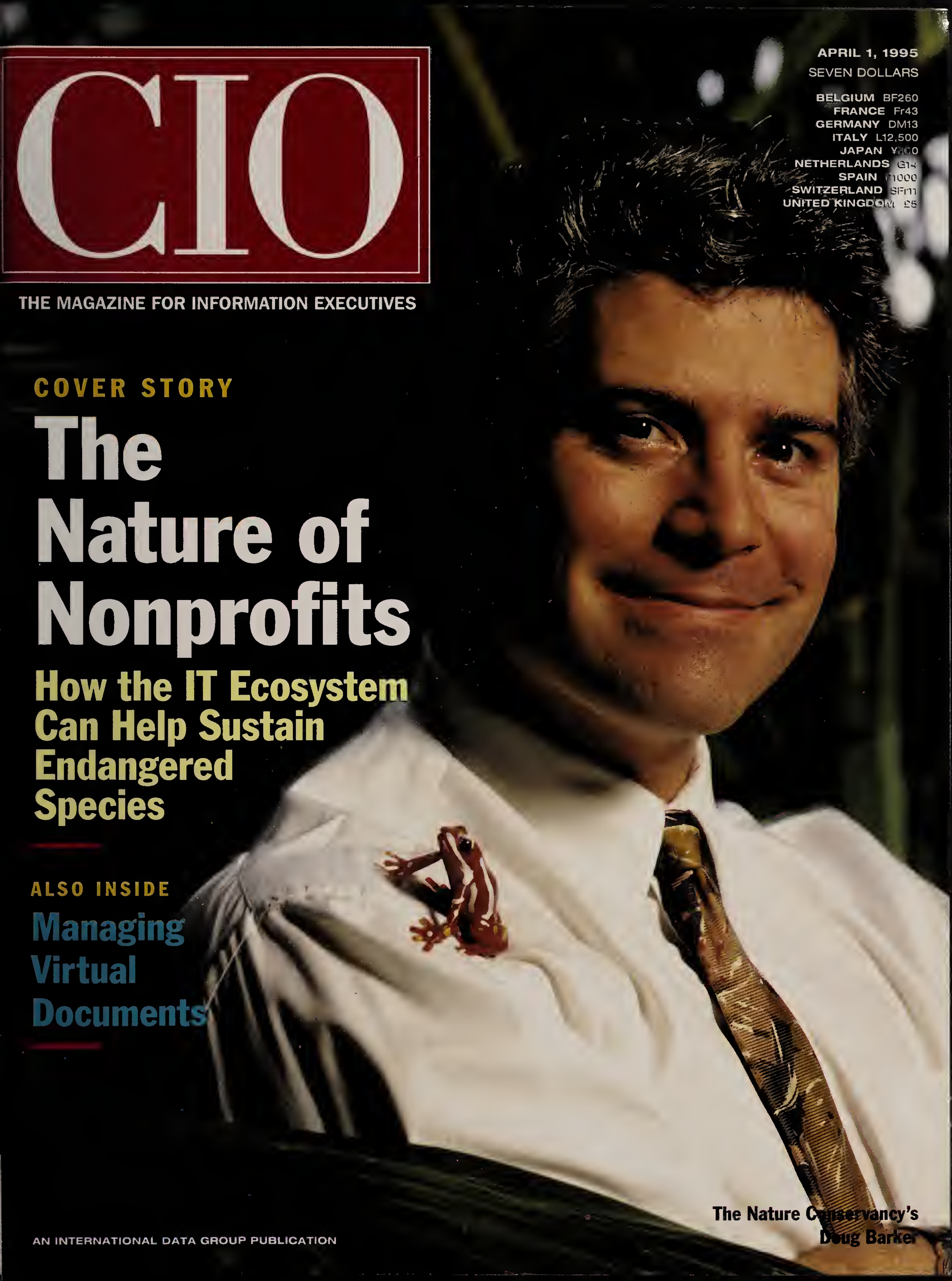
On February 6, 1996 CIO will host a special awards ceremony honoring the Enterprise Value Award winners at the annual *CIO* Enterprise Value Summit.

APRIL 1, 1995
SEVEN DOLLARS

BELGIUM BF260
FRANCE Fr43
GERMANY DM13
ITALY L12,500
JAPAN ¥800
NETHERLANDS G14
SPAIN ₧1000
SWITZERLAND SFr11
UNITED KINGDOM £5

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES



COVER STORY

The Nature of Nonprofits

How the IT Ecosystem Can Help Sustain Endangered Species

ALSO INSIDE

Managing Virtual Documents

The Nature Conservancy's Doug Barker

AN INTERNATIONAL DATA GROUP PUBLICATION

Carnival®
THE MOST POPULAR CRUISE LINE IN THE WORLD!™
The Message Center
PACIFIC BELL.
HSN
HOME SHOPPING NETWORK
NIKE®
CITIBANK®
UNITED AIRLINES
NATIONWIDE INSURANCE
Nationwide is on your side
®

You may not know it, but you use Unisys products and services every day.

The next time you cash a check, reserve a space on a plane or make a telephone call, you probably won't be thinking about us. But the fact is, you can do all those things more quickly and easily because we've been thinking about you.

We're Unisys—one of the major information services and technology providers in the world. And our solutions help all kinds of companies—like the ones whose familiar names you see here—provide you with better products and better service.

In fact, helping our clients serve their customers better is the guiding principle behind almost everything we do at Unisys. We call it our CUSTOMERIZE philosophy. It results in solutions that help organizations extend the power of information all the way to the points of customer contact. Which means they can be more responsive to what customers like you really want.

Right now, Unisys serves over 80 percent of the world's leading banks...over 140 airlines...over 1,600 government agencies...and 35 of the world's largest telecommunications companies. That adds up to a lot of people like you experiencing the many advantages of our customer-focused way of doing business.

UNISYS

We make it happen.

So if using the products and services of these companies helps make your life easier and more enjoyable, it pleases us, too. Because Unisys is behind each one of them. Call us at 1-800-874-8647, ext. 22. See how we can help make *your* organization well known for creating something truly valuable in business: satisfied customers.

cus·tom·er·ize \ kŭs'-tə-mə-rīze' \ *vt* **1:** to make a company more responsive to its customers and better able to attract new ones **2:** to customerize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide ***syn*** see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

© 1994 Unisys Corporation

In Database Technology, Mission-Critical Has Been Mission Impossible. Until Now.

Introducing CA-OpenIngres.

CA-OpenIngres. Advanced Technology. Mission-Critical Experience.

Total Replication
Transparent Gateways
Client/Server
Open Architecture
Fully Scalable
Object Relational DBMS
Dynamic Triggers
24/7 Support

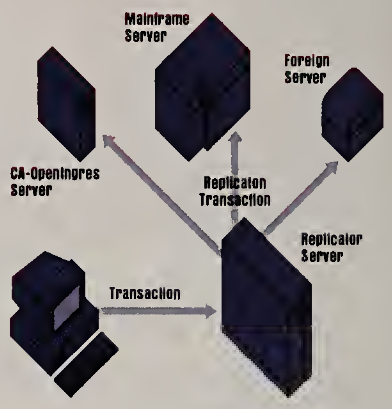
While other companies promise database technology you can trust for mission-critical client/server applications, only one company delivers.

Computer Associates. With the introduction of CA-OpenIngres®, we've combined the industry-leading technology of OpenIngres with our own unmatched experience in mission-critical heterogeneous computing.

It's a combination that turns the dream of global, enterprise-wide information management into reality. A feat CA-OpenIngres accomplishes by combining the robustness of classic production systems with the economy and flexibility of open systems.

Computer Associates offers 24 hour/7 day a week service and support.

The result is a single, logical view of disparate data whether it be relational, non-relational, local or distributed.



Foreign servers take part in replication, for integration of CA-OpenIngres systems with existing production systems.

And with our leading-edge Object Management Extensions, you're not just limited to text and numbers. OpenIngres allows you to develop your own business data types like times, dates, audio, video and other multimedia.

What's more, now that OpenIngres is CA-OpenIngres, product support will never be in doubt. Because Computer Associates is the only database company that includes technical assistance 24 hours a day, seven days a week standard, at no extra charge.

For More Information On The Advantages Of CA-OpenIngres, Call 1-800-225-5224, Dept. 12101.

CA-OpenIngres. In database technology, mission-critical is now mission accomplished.

COMPUTER® ASSOCIATES
Software superior by design.

UNIX **VMS** **NETWARE** **OS/2** **WINDOWS NT**

© Computer Associates International, Inc., Islandia, NY 11788-7000. All products referenced herein are trademarks of their respective companies.

CIO

VOLUME 8, NUMBER 12

COVER STORY

NONPROFIT ORGANIZATIONS 42

Doing Good by Doing Well

Running IS in a nonprofit organization is not all that different from running a profit-driven shop. But sometimes it requires a special kind of resourcefulness.

By Peter Fabris

How IT helps nonprofits stay one jump ahead **42**

Cover photo by Katherine Lambert

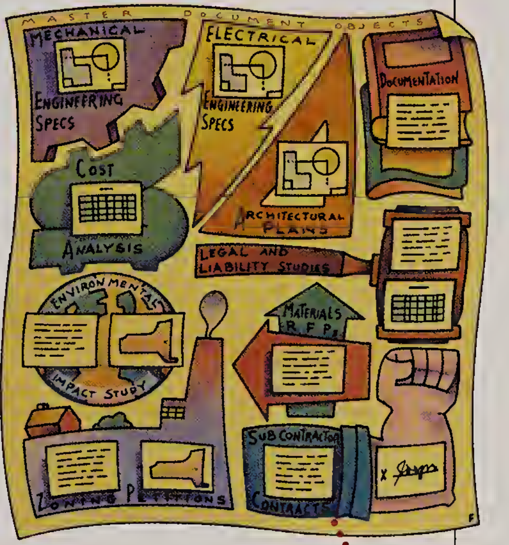
FEATURES

DOCUMENT MANAGEMENT 32

The Virtues of Virtual Documents

Kindergarten wisdom holds that selfish is naughty and sharing is nice. But with virtual document management, businesses can have it both ways. By dividing master documents into reusable objects, customized documents and information sharing are no longer mutually exclusive.

By Richard Pastore



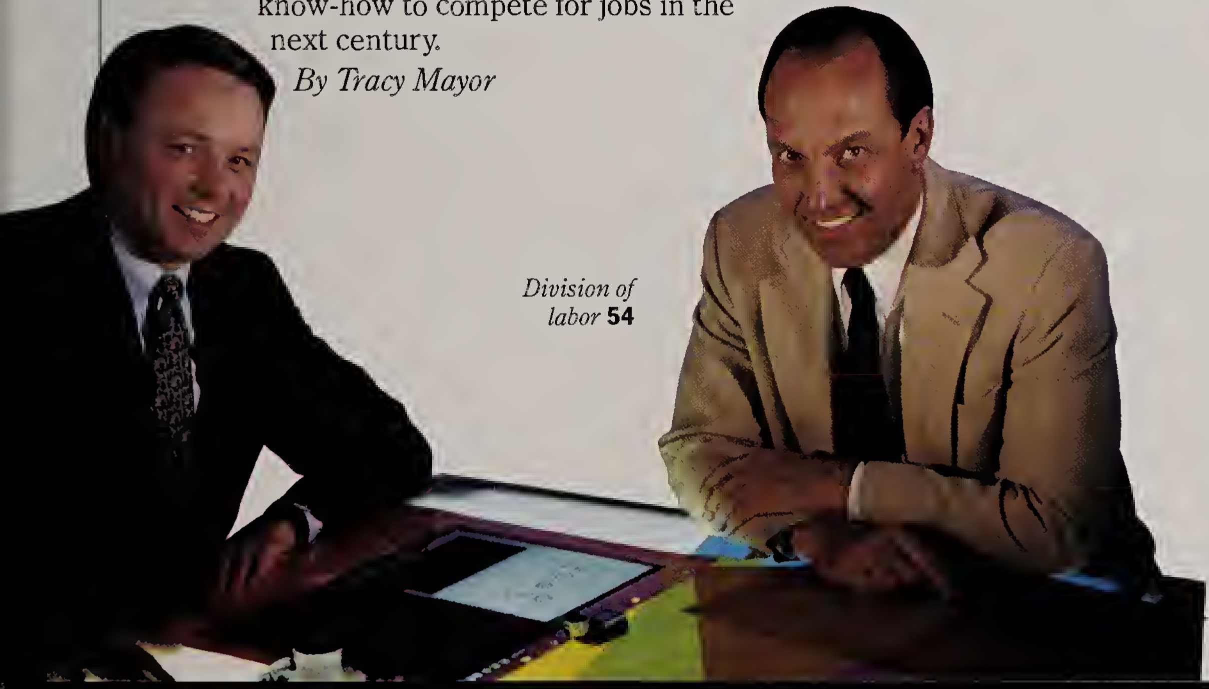
As you like it **32**

LABOR RELATIONS 54

The State of the Unions

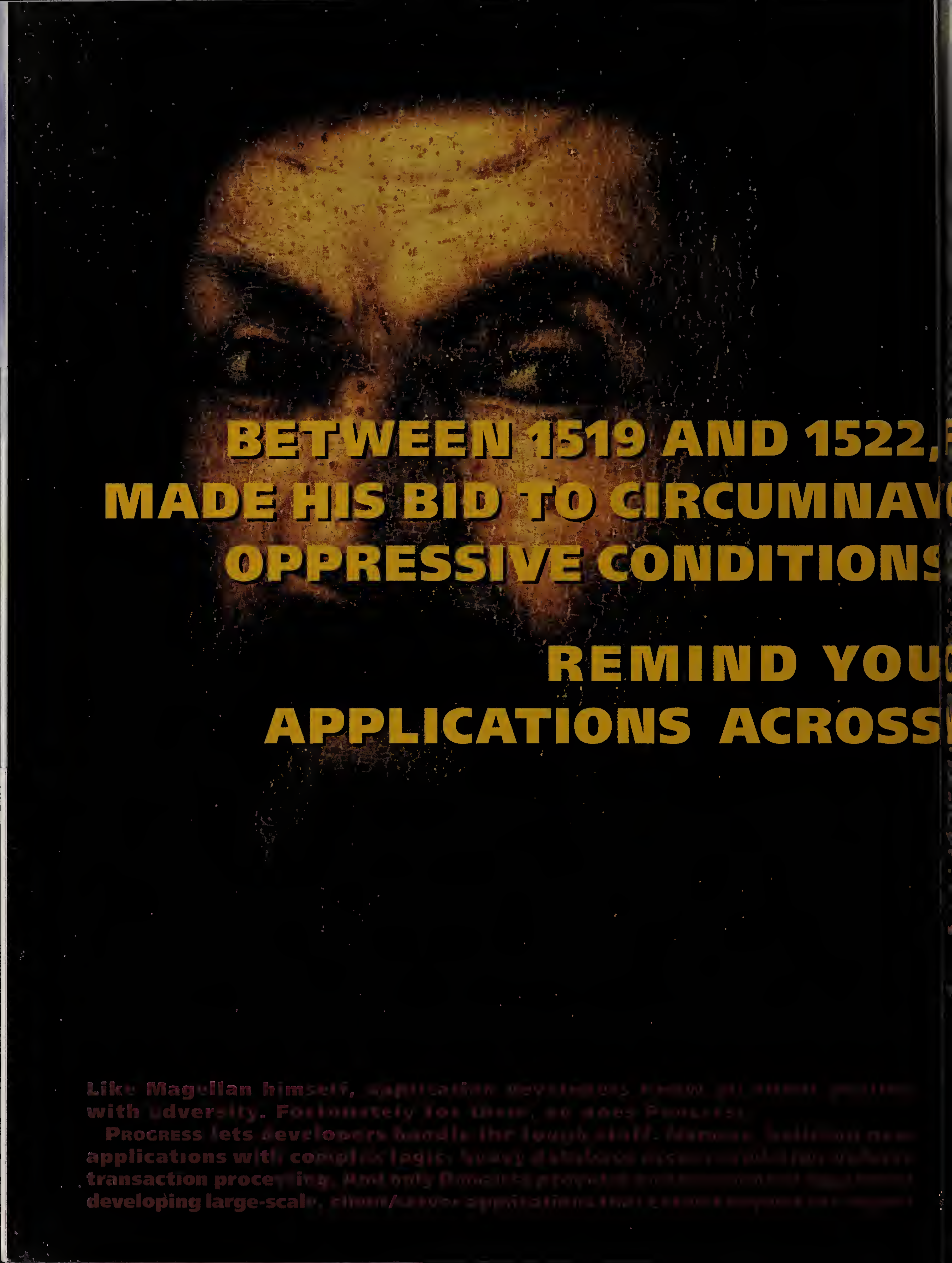
Wary and weary, organized labor fights to hold the line on job losses while ensuring its members have the technological know-how to compete for jobs in the next century.

By Tracy Mayor



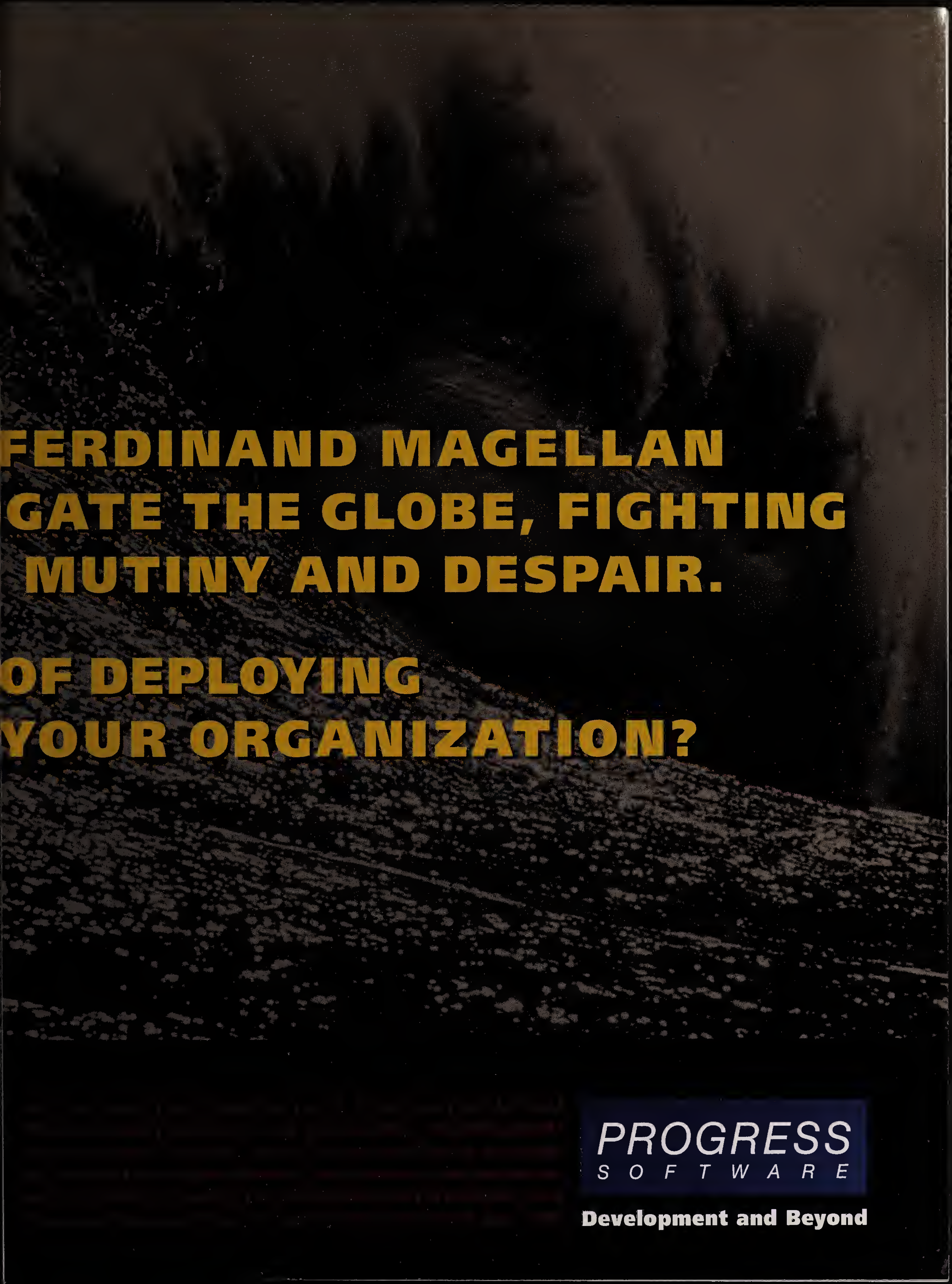
Division of labor **54**

MORE ▶▶▶



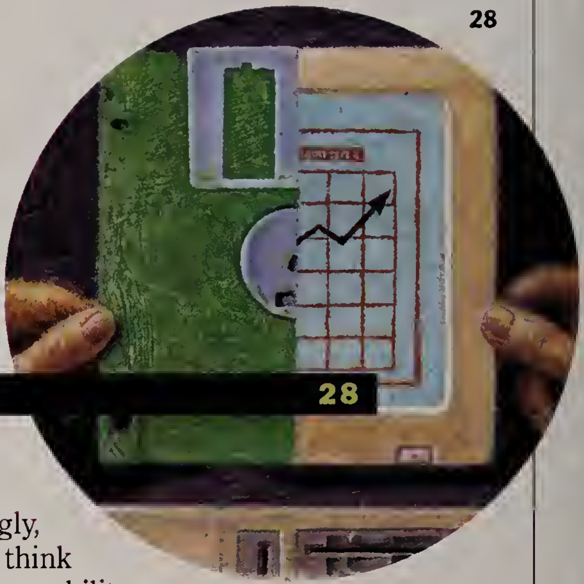
Like Magellan himself, application developers know all about [illegible] with adversity. Fortunately for them, so does PROGRESS.

PROGRESS lets developers handle the tough stuff. Namely, building new applications with complex logic, heavy database [illegible] transaction processing. And only PROGRESS [illegible] developing large-scale, client/server applications that [illegible]


FERDINAND MAGELLAN
GATE THE GLOBE, FIGHTING
MUTINY AND DESPAIR.
OF DEPLOYING
YOUR ORGANIZATION?
PROGRESS
SOFTWARE
Development and Beyond

CIO

COLUMNS



Double vision **28**

WINDOWS 95 **24**

GARTNER VIEW: MIGRATION PLANS

Microsoft's new operating system will require significant training and support. With 50 million copies of Windows 95 expected to ship in the first year, CIOs had best be prepared.

By William Kirwin

The fast lane **62**

I.S. CAREERS **28**

INSIGHTS: THEY ALSO SERVE

Not all IT-driven change emerges from the IS organization. Increasingly, valuable hybrids who know how to think about a business with technology's capability in mind are being deployed throughout the organization.

By Robert F. Morison

PARALLEL COMPUTING **62**

STATE OF THE ART: THE SPEED TICKET

Low prices and mainframelike performance are helping massively parallel processing make inroads into commercial applications.

By John Edwards

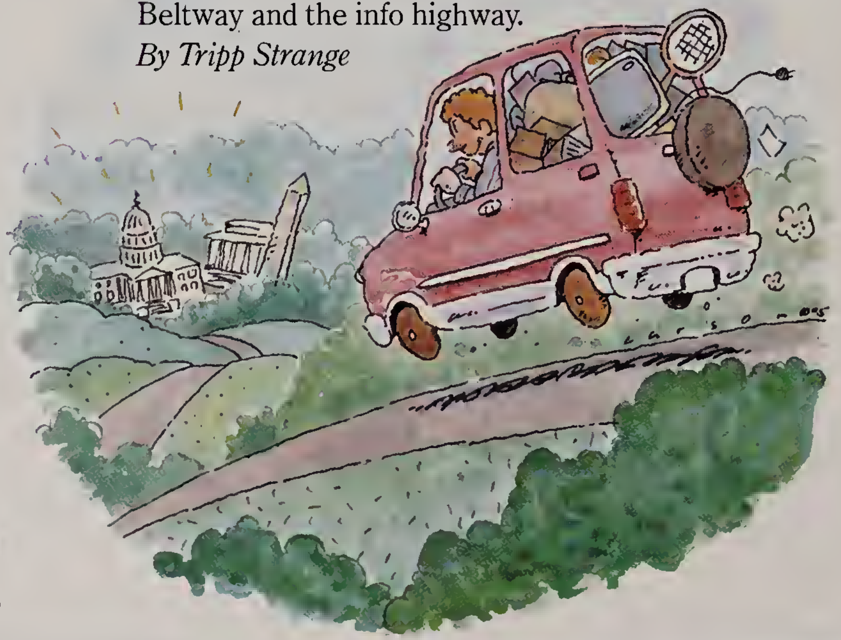
The game is up **14**

VIRTUAL GOVERNMENT **72**

CIO LIGHT: MR. TRIPP GOES TO WASHINGTON

Where he learns that, when it comes to reinventing government, there's the right way, the wrong way, the Beltway and the info highway.

By Tripp Strange



Compaq With America **72**

DEPARTMENTS

Editor's Letter **8**

Publisher's Letter **10**

Trendlines **14**

- Calendar of events
- Development chaos
- Preparing for disaster
- Integrator pressures
- Management theory
- Document security
- Interactive investing
- New ventures
- Computer games

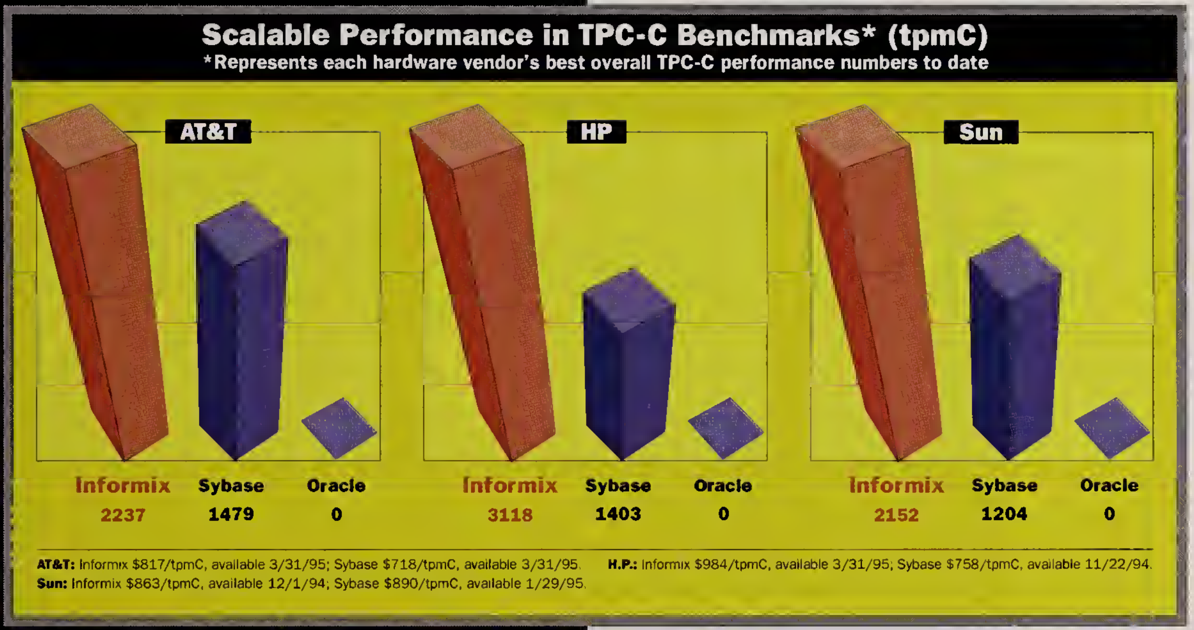
Index **70**

INFORMIX DYNAMIC SCALABLE ARCHITECTURE

Scalable Performance Only With Informix.

When it comes to demonstrating scalable OLTP performance, Informix continues to be the database of choice.

In fact, in open systems TPC-C™ benchmarks on the three leading UNIX® platforms, Informix is the database behind each hardware vendor's best overall performance. The numbers show that Informix has a proven scalability advantage over Sybase.



Scalable Performance in TPC-C Benchmarks* (tpmC)

*Represents each hardware vendor's best overall TPC-C performance numbers to date

AT&T: Informix $817/tpmC, available 3/31/95; Sybase $718/tpmC, available 3/31/95. **H.P.:** Informix $984/tpmC, available 3/31/95; Sybase $758/tpmC, available 11/22/94. **Sun:** Informix $863/tpmC, available 12/1/94; Sybase $890/tpmC, available 1/29/95.

And where's Oracle in all this? Missing in action.

Let's face it—if your database can't scale, then you can't support truly enterprisewide applications. If you're looking for the best, most extensive use of CPU power on uniprocessors, SMP, or MPP, look to Informix for scalable performance. And let the facts speak for themselves.

Call 1-800-688-IFMX, ext. 45 for a white paper on open systems database performance.

INFORMIX®

Find us on the Web! http://www.informix.com/

© 1995 Informix Software, Inc. Informix is a registered trademark of Informix Software, Inc. All other names indicated by ® or ™ are registered trademarks or trademarks of their respective owners.

LETTER FROM THE EDITOR

It's hard to believe that *CIO* is now in its eighth year of publication! Before Joe Levy and I started the magazine in the fall of 1987, we knew we wanted it to be people—not machine—oriented. And we didn't realize what a success our magazine would be. Faithful readers like you have given us great feedback over the years, and our editorial team is dedicated to meeting your ongoing need for information to do your jobs better.

I've had the great opportunity to be the founding editor of this fine magazine. I've watched issues, like outsourcing and client/server, barely a breath seven years ago, color the IT landscape. I've seen information executives grow in their positions. I've seen the once-technical role of CIO rise to new management heights in the organization.

Over the years I have met many of our readers at conferences, at meetings and in their offices. I have been impressed with the seriousness with which they regard their IT mandates and the often-heroic measures they've taken to overcome enterprise obstacles.

Needless to say, my years at *CIO* have been a learning process for me and I am grateful for the opportunities I've had to track emerging trends and participate with our readership. I have enjoyed the past seven years immensely, but it is now time to move on. For a while, I'll be traveling and exploring new ventures. I've long had a penchant for vacationing on the beach as well as traveling to exotic countries. And my keen interest in photography calls for further study and exploration.

The decision to leave my position as editor in chief of this magazine was a very difficult one to make. I am confident that our editorial team will carry on *CIO*'s tradition of fine coverage. As always, the magazine will continue to report on the latest in technical and managerial trends that affect our readers.

Meanwhile, I will be looking at the happenings in information technology with a fresh perspective. As I embark on my new adventures, I bid you farewell and wish you all good luck.

Marcia Blumenthal

CIO

© By CIO Communications, Inc.

President and Publisher	Joseph L. Levy
Editorial Director	John C. Whitmarsh
Editor In Chief	Marcia Blumenthal
Executive Editor	Lew McCreary
Art and Design Director	Mary L. Marshall
Managing Editor	Abbie Lundberg
Senior Editor	Leigh Buchanan
Senior Editor	Richard Pastore
Associate Editor	Katherine A. Auer
Associate Editor	Alice Dragoon
Associate Editor	Elaine M. Cummings
Production Editor	Cheryl R. Davis
Senior Writer	Carol Hildebrand
Senior Writer	Anne Stuart
Senior Writer	E.B. Baatz
Senior Writer	Megan Santosus
Staff Writer	Peter Fabris
Senior Graphic Designer	Kim Morneau
Graphic Designer	Linda Golon
Graphic Designer	Michael Siggins
Associate Graphic Designer	Kelli Walton
Editorial Researcher	Brooke R. Burton
Administrative Assistant	Tracey A. Grogan
VP/Marketing	Cathy O'Leary Hayes
VP/Production	Lori Beth Sadewitz
VP/Finance & Admin.	Walter Manninen
Assistant to the Publisher	Diane Martin
VP/Circulation	Carol A. Spach
Fulfillment Manager	Susan Woodworth
Production Associate	Resa Altsher
Ad Traffic Coordinator	Kathy A.W. Grybauskas
Senior Promotions Specialist	Marcy L. Dill
Senior Research Analyst	Bridget Cammarata
Strategic Marketing Analyst	Robin L. Azar
Marketing Coordinator	Dot Caspersen
Circulation Assistant	Denise Perreault
Billing Coordinator	Lynn J. Palmquist
Operations Specialist	Carmen J. Bryer
Systems Specialist	Michael Di Palma
Senior VP/Exec. Programs	Lynda Rosenthal
Manager, Program Services	Nancy A. O'Connell
Manager, Program Planning	Susan T. Montgomery
Manager, Program Operations	Cynthia Laird
Sr. Program Comm. Specialist	Sara Evangelous
Administrator, Exec. Programs	Liz Hecht
Program Coordinator	Brian Fuce
Ancillary Products Specialist	Bill Kerber

Contributing Writers John Edwards, William Kirwin, Tracy Mayor, Robert F. Morison

Editorial Offices CIO Communications, Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Mass. 01701-9208 (508) 872-0080, FAX (508) 879-7784. Printed in the U.S.A. **Subscriber Services** (800) 788-4605, FAX (508) 872-0618. **List Services** (800) 859-LIST

IDG
INTERNATIONAL DATA GROUP

Board Chairman	Patrick J. McGovern
President	Kelly Conlin
Chief Operating Officer	James Casella
Executive Vice President	William P. Murphy

BPA INTERNATIONAL®

PHOTO BY WEBB CHAPPELL

How Important Is Data Storage To Your Company?

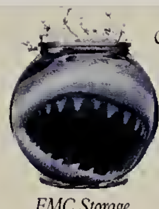
We'll Rephrase That.

How Important Is Revenue To Your Company?

You may not recognize your company's data storage as a source of revenue. But with your company's information now more crucial to your competitiveness than ever, how quickly you get that information to your customers and employees is more important than ever. Which is what EMC data storage does. It gives sales people more time to sell by giving them the information they need faster. It makes your customers happy, too, by speeding up customer service.

Call 1-800-424-EMC2 ext.149. Find out how EMC data storage does plenty more than take in data. It rakes in profits.

Storage



EMC Storage

REVENUE IS INCREASED BY A FACTOR OF EMC^2

THE STORAGE ARCHITECTS

EMC, the EMC logo and THE STORAGE ARCHITECTS are trademarks of EMC Corporation. © 1995 EMC Corporation. All rights reserved. Outside the US. call (508) 435-1000 ext. 8193.

PHOTO BY WEBB CHAPPELL

Seems like everyone is doing it these days. The temptation is just too great to ignore. And sooner or later you, too, will be caught up in the frenzy—if you aren't already. Even nonprofit organizations have jumped on the bandwagon (see "Doing Good By Doing Well," beginning on Page 42).

What these companies are doing is hitching a ride on the information superhighway. And if you don't get your organization in gear, it will be left by the side of the road. The business applications can be virtually limitless, especially considering that more than 50 million people are expected to be accessible through the Internet by the turn of the century. Just think of the possibilities: e-mail, job recruitment, global communications, competitive tracking, research, training, direct-mail marketing, electronic commerce, customer service, user support, public relations, virtual conferencing—to name just a few.

The CIO's involvement is critical. An enterprisewide strategy will ensure a return from doing business on the Net, and the time to start planning one is now. Internet consultants will be knocking on your door. World Wide Web servers and access software will need to be evaluated. Security issues must be analyzed. Then there's always the issue of training. Webmasters, the business-unit champions of this new technology, will need plenty of technical assistance.

CIOs are fortunate enough to sit at the intersection between business and technology. In this position, they are best suited to implement a sound business strategy for Internet usage. Are you ready to connect to the future?

Speaking of the future, our founding editor in chief, Marcia Blumenthal, is leaving the *CIO* family to pursue other interests. We wish her well in her endeavors.

P.S. Are you the strategist behind an innovative IT solution? If so, please heed our Call for Entries for the Enterprise Value Awards. *CIO* created the Enterprise Value Awards to honor executives who craft innovative IT solutions to enhance business value. For details, please refer to the application available in this issue (following Page 20).

Coming In CIO

Bandwidth Blues

Many companies today are under increasing pressure to upgrade their networks in order to accommodate the needs of bandwidth-hungry applications such as imaging, groupware and EDI. What's a CIO to do? Some have already taken action, but for most corporations, today's requirement is to get ready for tomorrow's needs. It's time to think, plan and learn about the technological options.

Personnel Computing

The human-resources department is being transformed, thanks to technology such as kiosks, voice response, resume scanning and workflow applications. Whereas traditionally much of the department's time was occupied by paper-pushing administrative chores, today these tasks are being outsourced or offloaded to employees via self-service technology. The result: HR can be more of a strategic player in the organization.

What's in a Name?

What's a chief technology officer? Nobody seems quite sure. In a few organizations, the CTO is simply the CIO by another name. At others, the CTO plays a much bigger role on the business side than the CIO ever did. And at still others, the CTO rarely ventures out of the IS department. CTOs remain a relatively rare breed, but some consultants predict that their ranks will rise rapidly over the next five years. We'll try to pin down this position, including how it compares with the CIO and how it can affect the organization.

We do one thing. But we do it very, very well.

We specialize in large scale business computing. That's where companies have large numbers of users, high volumes of transactions, large databases and the need for continuous access to critical information.

And in today's open computing environment these demands can only be met by an advanced UNIX-based operating system—a system like Data General's DG/UX. According to technology assessment firm Illuminata*, DG/UX is rated the best overall commercial UNIX on the market. That's higher than Digital, IBM, Hewlett-Packard and Sun.

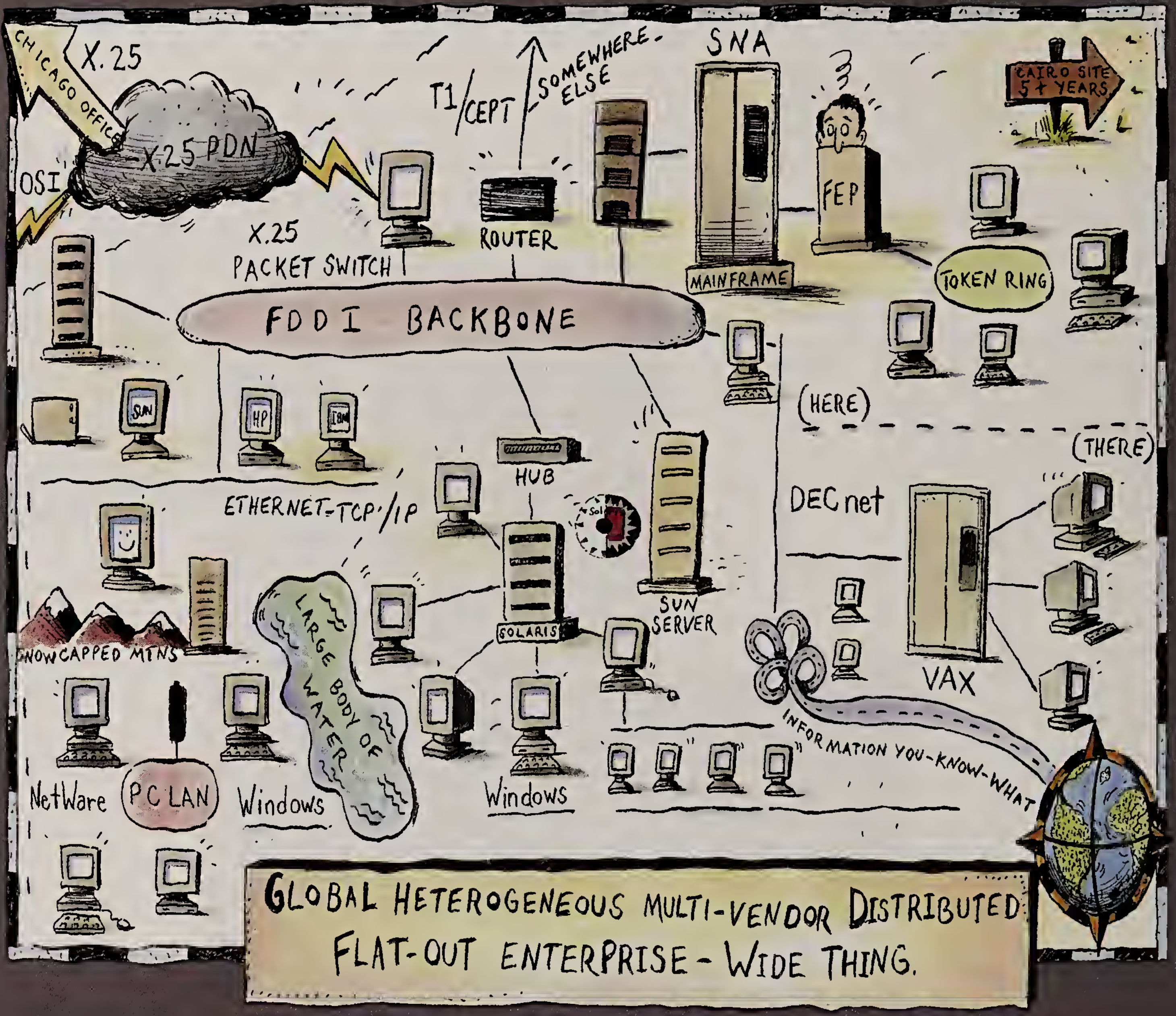
We combine DG/UX with the best servers, the most advanced storage systems, world class business software and the integration services to make it all work.

This is our specialty. And we do it very, very well.

Call 1-800-DATA GEN for our free guide to corporate computing, e.mail us at common sense @ dg.com, or log on to The Common Sense Connection℠ at www.dg.com or gopher.dg.com.

Data General
Bringing Common Sense to Computing

*UNIX Products: "An Analyst's Scorecard." November 7, 1994. Illuminata.
© 1995 Data General.



The Bigger.

Introducing Solstice™. It's the single solution for managing all your systems and your whole network, too. No matter how big, gnarly, or heterogeneous the whole thing gets. Unlike the competition, Solstice gives you fully-integrated system and network management. From PCs to routers all the way to the data center. And Solstice is fully scalable, from a few nodes up to tens of thousands worldwide. It works with

©1995 Sun Microsystems, Inc. Sun, the Sun logo, SunSoft, Solstice and Solaris are trademarks of Sun Microsystems, Inc. All other trademarks are property of their respective owners.

The Better.

your existing hardware and software, which is just one way it lowers your operating costs. And best of all, Solstice actually exists. Right now. Find out more. Call 1-800-SUNSOFT, or see us on the Internet at http://www.sun.com/sunsoft/ And do it soon. Before the whole enterprise gets the better of you. SunSoft Software Products

Sun
The Network Is the Computer™

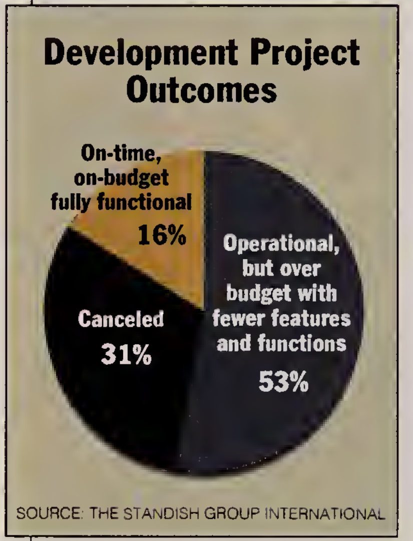
SLST1A

TRENDLINES

SOFTWARE DEVELOPMENT

WHEN ALL ELSE FAILS

If misery loves company then CIOs helming disastrous development projects have plenty of company to love. Many of the 175,000 IT application projects underway each year either experience major time and cost overruns or go down in flames, according to a recent study by The Standish Group International Inc., a market-research and consulting firm based in Dennis, Mass.


Development Project Outcomes

SOURCE: THE STANDISH GROUP INTERNATIONAL

The report concludes that "software-development projects are in chaos," with 31 percent canceled before they reach completion and another 53 percent coming in at nearly twice their original cost estimates (see chart). Based on these findings, the firm estimates that in 1995 American companies and government agencies will spend $81 billion for canceled projects and $59 billion for projects that run past deadline. These aren't cutting-edge applications either, but projects "as mundane as a driver's-license database, a new accounting package or an order-entry system," says the report.

On the success side, the study shows that only 16.2 percent of all software projects are completed on time and on budget, and that figure drops to 9 percent for large companies. Furthermore, many completed projects are a mere shadow of their original specifications: Projects completed by the largest American companies have only 43 percent of the planned features and functions, according to the report. (Smaller companies do better, completing 78 per-

PREPARING FOR APOCALYPSE NOW

The amount Americans spend on lotteries and the amount companies spend on disaster-recovery systems have something in common: They both attest to the fact that we are a nation of gamblers. Despite the constant reminders that mission-critical IT operations are vulnerable to the worst that man and nature can dish out—the earthquake in Kobe, Japan; Hurricane Andrew; the World Trade Center bombing—less than 1 percent of the money spent on software and services last year went to disaster-recovery technologies, according to Input, a market-research firm in Mountain View, Calif.

Only about 10 percent of U.S. companies that rely on computers have disaster insurance, according to IBM Corp., a major player in the field. And the majority of those that do are financial-services firms that are legally required to carry it. A recent study by Comdisco Inc., the Rosemont, Ill., provider of disaster-recovery services, and Palindrome Corp., a developer of data-protection and restoration software, based in Naperville, Ill., shows that 82 percent of such firms designate alternative sites in case their data centers are disrupted, compared with 62 percent in other industries.

But data centers aren't the biggest problem, Comdisco suggests. As the proportion of computing power allocated to LANs has nearly doubled in the last two years, disaster planning has not kept pace. As a result, "the overall number of distributed systems that remain vulnerable is greater than ever," says Michael Tobin, Comdisco's vice president of marketing.

The lack of concern over LAN operations is apparent in other findings as well. While 60 percent of organizations store their data-center backups off-site, only 40 percent do so for their LAN data, the study suggests. And twice as many organizations have written recovery plans for their data centers as for their LANs. ■

CHART BY MICHAEL SIGGINS; ILLUSTRATION BY JEAN BAILEY

DON'T
PAY FOR
SOFTWARE
NO ONE
IS USING

PATENT PENDING

Are you paying rental or maintenance fees for MVS mainframe software you're not using anymore? Are only a few people using a product that takes a lot of time and effort to support? Do you have software on one system just because it's on another system?

SoftAudit answers all these questions automatically! SoftAudit finds all the load modules on your MVS system and, using its extensive knowledge base of IBM and non-IBM products, identifies what products they belong to. Then, without interfering with normal operations, it tracks and logs every execution of every load module–no matter how it's invoked–so it knows about every product that's used.

With its extensive reporting capabilities, SoftAudit tells you what products you have installed, where they are, and how often and by whom they're used–if they're used at all! For more information, including a free copy of the Gartner Group report on SoftAudit, call Isogon Corporation today at (212) 376-3200 or **(800) 568-8828**.

SoftAudit
END THE SOFTWARE CONFUSION.

ISOGON CORPORATION

TRENDLINES

cent of their software projects and delivering nearly three-quarters of planned features and functions.)

In addition, The Standish Group found that a high percentage of IT executives believe there are more project failures now than there were five and 10 years ago, despite the fact that technology has had time to mature.

The 365 IS professionals surveyed gave numerous reasons for this dismal record, including incomplete requirements, lack of user involvement, lack of resources and unrealistic expectations. One application analyst at a bank blamed "brain-dead users, just plain brain-dead users" for his organization's problems. "Changes, changes, changes; they're the real killers," complained the director of IS at a securities firm.

A project manager at an insurance company described his experience with a 30-person project that came in two years late. "We delivered an application the user didn't need," he said. "They had stopped selling the product over a year before."

The Standish Group can be contacted at 508 385-7500. ■

EVEN GREATER EXPECTATIONS

As business managers increasingly initiate, lead and fund IS projects, systems integrators are going to find it harder to get by on their dazzling smiles and engaging personalities. In fact, integrators can expect a backlash, "as managers who have been sold unrealistic system-delivery promises face the reality of time and budget overruns," according to Summit Strategies Inc., a consultancy based in Boston.

John Daly, a senior industry analyst with Summit, attributes part of the expectation-control problem to the fact that mangers typically have little appreciation for the intricacies of system design and the problems that delay large-scale implementations. Still, integrators will have to adapt to meet the new demands: taking on staff with greater business knowledge and collaborating closely with other specialists. Already, the average number of contractors in a large-system engagement has increased from three to 10 in just four years, according to Summit.

"Most integrators will increasingly sell to line-of-business managers rather than to MIS executives—placing a premium on vertical and diagonal marketing, sales and delivery capabilities, business-reengineering expertise and reusable vertical applications," says Daly. "Integrators with low-cost systems-solution templates tailored to these business models will grow rapidly, at the expense of those who focus on developing custom solutions for each engagement." ■

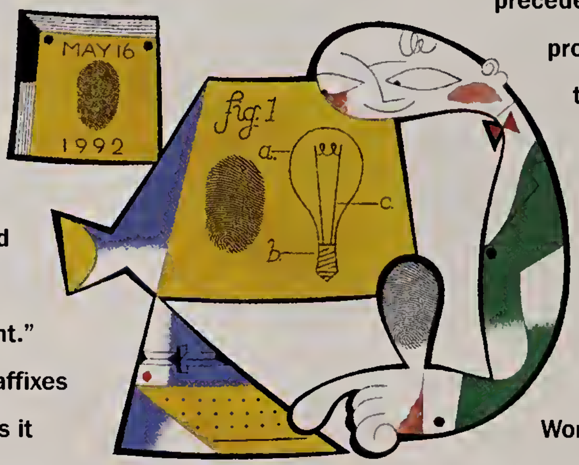
CLARIFICATION

In the Jan. 15 issue of *CIO*, an editor's note that ran within the feature about Kmart made mention of the fact that, after the story had been reported, former CIO Dave Carlson was replaced as Kmart's senior IS executive. Our intent was simply to report that this event had occurred. We did not intend to imply that it was in any way justified or that it had resulted from poor performance on Carlson's part. We regret any misunderstanding the note may have caused.

KEEPING YOUR RECORD SPOTLESS

Electronic records aren't like soap: 99 and 44/100 percent pure just isn't good enough. That's why Surety Technologies, a spinoff of Bellcore based in Chatham, N.J., created the Digital Notary—a sort of chastity belt for digital documents.

The system lets users freeze the contents of a document in time by commanding the software to create a unique "fingerprint" for it and then sending that fingerprint to a coordinating server via the Internet, a leased line or dial-up connection. The coordinating server mathematically combines all the fingerprints it receives each second and produces what Surety calls a "super fingerprint." The server essentially affixes a time stamp and sends it back to the user's computer, at which point the Digital Notary issues a certificate for the document and stores it in a database of the user's choice. Armed with the document and the certificate created for it, users can then validate that the document has not been altered. And because only the fingerprint—not the document itself—is sent to the server, no third party can gain access to privileged information.



Surety suggests numerous applications for the product, ranging from banks that need to ensure the integrity of financial records to research organizations that want to establish precedence for intellectual-property claims to hospitals that must verify the reliability of medical images.

A special, single-user version of Digital Notary is available from the company's World Wide Web site at *http://www.surety.com.* For information, contact the company at 201 701-0600 or *info@surety.com.* ■

ILLUSTRATION BY PHILIP ANDERSON

Two Strategies for Client/Server Applications Development

Both in One Software...the SAS® System

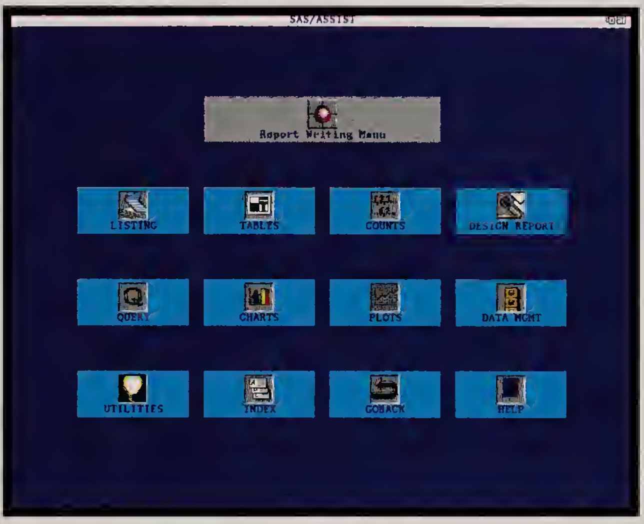
Only the world's leading information delivery system gives you two proven strategies for satisfying today's client/server applications development needs:

Empower Your User Community

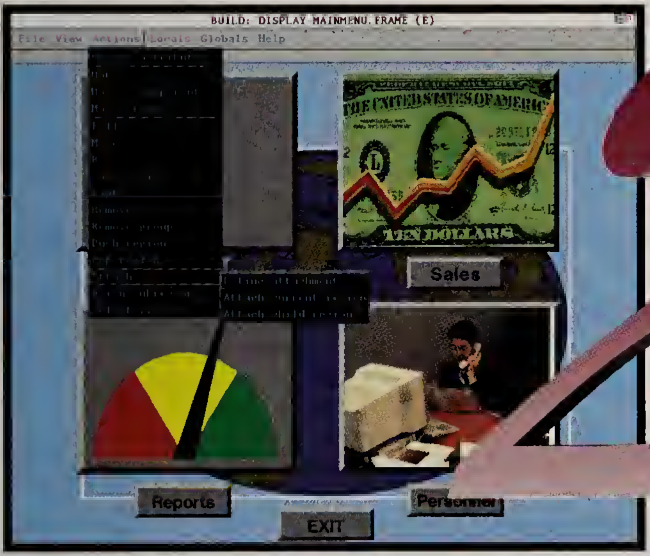
1

The SAS System offers a secure and manageable environment for making enterprise data available on demand. And for turning that data into useful business information for strategic decision making.

Through an intuitive, dynamic, and data-driven interface, even novice business users can handle the most sophisticated requests by themselves: ad hoc queries, reports, business graphs, forecasts, analyses, and more. By making the SAS System your standard for end user access and reporting, you'll empower users to satisfy their own information requests.



Empower Your Applications Developers


BUILD: DISPLAY MAINMENU.FRAME (E)
File View Actions Locals Globals Help
Sales
Reports
Personnel
EXIT

2

With more self-reliant end users, developers are free to concentrate on implementing client/server applications critical to your business. Here, too, the SAS System satisfies your most demanding requirements by supporting an *iterative* approach to rapid applications development. Put strategic business systems in production quickly... even as you continue to develop and enhance them.

Object-oriented tools simplify and speed development. And support for multiple client/server models (including distributing application logic to the processor best equipped for the task) provides a flexibility unrivaled by "client only" development tools. What's more, the SAS System's portable architecture means applications look and run the same no matter where you deploy them, desktop to data center, preserving your applications investment over the long haul.

Take a Minute Now to Take Years Off Your Development Cycles

With the SAS System, you'll improve business processes rather than just automating them. Users become more independent, developers more productive, and applications more valuable...today and tomorrow. For a closer look at the SAS System—and to find out how to receive these applications development tools for a free evaluation—just give us a call at 919-677-8200.

SAS®

SAS Institute Inc.
Sales and Marketing Division
Phone 919-677-8200 ☐ Fax 919-677-8123
In Canada: Phone 1-800-363-8397

SAS is a registered trademark of SAS Institute Inc. Copyright © 1994 by SAS Institute Inc.

Please visit us at
Booth #6811 at AIIM.

“CHANGE

Now that you know your goal, we introduce the way to achieve it.

Composer
by IEF™

Composer is a suite of powerful application development software.

Today’s marketplace doesn’t accept excuses. If your information systems can’t quickly adapt to your customers’ changing needs, you could be history.

In this demanding environment, the stakes are too high to risk your company’s future on underpowered, unproven solutions that promise more than they can deliver.

That’s why we developed Composer by IEF™. Composer is a suite of application development software backed by a successful 9-year track record and over 1,100 of the most prestigious businesses and government agencies in the world.

No longer must your business be forced to choose between applications that are powerful, and those that are easy to use. With Composer by IEF, you can build quickly, and expand easily. On everything from simple remote data access client/server systems to more complex distributed process systems. In fact, Composer is unsurpassed in both application and development scalability.

Once the requirements of your business change, it is crucial that your information systems quickly adapt. You can’t afford to be constrained by multiple platforms/databases, operating

Composer by IEF and “Extending Your Reach” are trademarks of Texas Instruments. ©1995 TI.

OR DIE."

systems and languages. And with Composer, you don't have to be.

Instead, your developers can focus on your business problems rather than on complex technologies and methodologies. Because Composer by IEF allows them to build and deploy applications without being technology experts.

Think of the money saved by not having to retrain your staff. Think of the capital expenditures you won't have to make for new tools for growing technologies.

Still haven't heard about Composer by IEF? Your competitors have.

"Composer by IEF is very exciting. We have converted models, converted code and have not had any problems. We have been having a great time with all the new features." – **PSI Energy**

"Composer by IEF will save the enterprise time and money." – **State of Missouri**

"TI provided a tool and methodology which allowed us to keep IS resources firmly committed to business issues as opposed to the technical components of a client/server application." –**Travelers Insurance**

Judges were recently so impressed with Composer by IEF, they gave Texas Instruments and Travelers Insurance the DB/EXPO '94 RealWare Award for "Client/Server Computing in Support for Mission-Critical Business Opportunities."

The excitement of Composer by IEF is captured in a white paper about enabling business change through information technology. A copy is yours when you call our global network of sales and support offices at **1-800-838-1843, ext. 2100.**

EXTENDING YOUR REACH™

TEXAS
INSTRUMENTS

TRENDLINES

MANAGEMENT THEORY

EVERYTHING OLD IS NEW AGAIN

You've probably never heard of her, but you've certainly heard her ideas. Flip through any dusty volume of her writings from the 1920s and the vibrant themes of 1990s management theory leap out. Cross functioning. Game theory. Diversity. Change agents.

Her name is Mary Parker Follett, and until recently her work was largely eclipsed by Frederick W. Taylor's scientific-management theories. But the Harvard Business School Press has rediscovered her and released a collection of her speeches and articles: *Mary Parker Follett—Prophet of Management: A Celebration of Writings from the 1920s* (HBS Press, 1995). Follett's modern-day fans include Peter Drucker, who calls her the "prophet of management," and Rosabeth Moss Kanter, who dubs her an "insightful giant...whose ideas will appear fresh and timely to new readers."

Born in 1868 in Quincy, Mass., Follett began her career as a social worker, then rose to prominence after publishing a bestselling book on organizations and government in 1918. Respected by many as an original thinker in the emerging fields of industrial relations and business management, she became a sought-after speaker and advisor to businessmen on both sides of the Atlantic.

Follett's ideas should be familiar to anyone keeping up with current management trends. She was, for example, an early advocate of participative management, peer networks and "cross-functioning between different departments." Her observation that "many businesses are now organized in such a way that you do not have an ascending and descending ladder of authority" could come from practically any volume in the business section of the local Barnes and Noble.

The wisdom of promoting teams and an empowered workforce emerge clearly in Follett's essays. "The matter of workers' control which is so often thought of as a matter of how much the managers will be willing to give up, is really as much a matter for the workers, how much they will be able to assume," she writes. "Where the managers come in is that they should give the workers a chance to grow capacity or power for themselves."

If Follett's ideas were so prescient, why did she languish for so long in obscurity? Drucker suggests that she was too subversive for her time, while Kanter speculates that sex bias probably played a role.

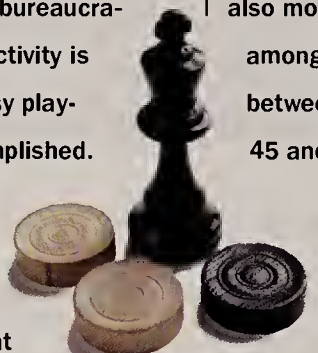
No matter what the reason, *Prophet of Management* has finally reinstated Follett as a leading figure in the history of management theory. And every business guru with a book on the bestseller charts should acknowledge that they owe her a debt.

–*E.B. Baatz*

PHOTOGRAPHY BY TOM CROKE; PHOTO COURTESY OF HARVARD BUSINESS SCHOOL PRESS

GAMES PEOPLE PLAY (ON COMPANY TIME)

Forget about inefficient work processes and excessive layers of bureaucracy: The reason corporate productivity is down is that everyone's too busy playing *Tetris* to get anything accomplished.



A new study by Coleman & Associates Inc., a Teaneck, N.J., market-research firm, has found that nearly one-quarter of the people who play computer games played their last one at work. More women than men pleaded guilty to indulging in electronic recreation on company time (27 percent compared with 19 percent) and middle-management types making $40,000 to $50,000 were the worst offenders.

Game playing was also most common among people between the ages of 45 and 54 (29 percent), contradicting the image of pimply faced 16-year-olds breathing heavily over *Doom*. Finally—and perhaps not surprisingly—the practice is widest in the laid-back South and least popular in the uptight Northeast.

Coleman & Associates arrived at its conclusions after questioning 1,003 adults nationwide in a random telephone survey. While it says its results are accurate plus or minus 3.5 percent, keep in mind that the people most intently dropping shapes on top of other shapes probably didn't hear the phone ring. ■

SAVE $29

YES, enter my one-year subscription (21 issues) to CIO magazine and bill me later for only $69, a savings of $29 off the basic rate.

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

The basic one-year subscription rate for CIO magazine is $98.
This is a domestic rate only (U.S. and Canada) The foreign rate is $185 U.S.

SD94

PROCESS IMMEDIATELY

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9486

Application Form

Enterprise Value Awards For 1995

Honoring executives who craft innovative information technology solutions to enhance business value

Sponsored by CIO Communications Inc.

APPLICATION DEADLINE: JULY 1, 1995

The Enterprise Value Awards℠

Honoring executives who craft
innovative information technology solutions
to enhance business value

SPONSORED BY

CIO

CRITERIA

Winners will be chosen by a panel of independent judges from among entrants who have submitted completed application forms to CIO by July 1, 1995. Entries will be judged on the following criteria:

- The extent to which the system adds business value in furthering the organization's strategic objectives
- The measurable financial return the system provides to the organization
- The extent to which IT was key to achieving the overall business solution—the "couldn't have done it without technology" factor
- The quality of collaboration between the business unit and IS organization that is achieved throughout the course of the project

All finalists will be subject to an in-depth analysis of the nominated system (to be performed by CIO or its agents). This analysis, which may require a site visit, will be based on interviews with sponsoring executives and system users, and will be designed to substantiate all claimed benefits. Notification of winners will occur on or about Oct. 16, 1995. CIO reserves the right to publish relevant cost and savings figures that establish the claimed ROI of the system; *the willingness to divulge this information for publication is a condition of entry.*

DEFINING VALUE

We invite applicants to consider the broadest possible spectrum of enterprise value. The following list of IT-enabled benefits is intended to help guide applicants' thinking:

- new, innovative and more productive ways of doing business;
- revamped organizational structures or styles of performing the work of the enterprise;
- the ability of the enterprise to enter a new market;
- successful global operation or expansion;
- transformation of the way the enterprise competes within its customary market or that alter the terms of competition within the market;
- improvement of the enterprise's relationships with its external customers;
- improvement of the enterprise's relationships with its own employees or among its functions (such as marketing, finance or human resources);
- the ability of the enterprise to compete more effectively by adding to the sum of its available knowledge assets;
- leaner and more economical operations.

ENTRY GUIDELINES

- The system must have been operational prior to July 1, 1993.
- Entrants must agree to be featured, along with their system and organization, in a *CIO* article.
- Entries must be complete.
- Entries must be on 8.5x11-inch paper, one side per sheet.
- The application form may be reproduced.
- Multiple entries from one company will be considered, but each entry must be submitted separately.
- Entries must be made jointly by the IS executive AND the business sponsor for whom the system delivers value.
- IT vendors, public-relations and advertising firms, consultants and other third parties may NOT apply on behalf of another firm. They are encouraged to forward this form to the "owner" of the system, or to contact CIO Communications to recommend that an application form be sent to their client.
- All entries must be computer-generated or typed; no handwritten entries will be accepted.
- When feasible, an additional copy of the entry should be sent on a 3½ -inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with Microsoft Word and Microsoft Excel on an IBM or Macintosh platform.

Finally, an award for information technology that recognizes people and their organizations.

MOST AWARD PROGRAMS recognize "Best Product" or "Most Innovative System." How about rewarding the strategists who take those products or systems and make them work to their best potential? They really deserve the credit.

As an IT or business executive who has built or utilized an information technology system that delivers both demonstrable ROI and strategic value to your organization, you deserve recognition and praise. CIO has created the Enterprise Value Awards to honor the architects of innovative IT solutions and in doing so, hopes to inspire others in their search for enterprise value.

ENTERPRISE VALUE AWARDS TIMELINE

APPLICATION DEADLINE: July 1, 1995

JUDGES SELECT WINNERS: October 1995

ANNOUNCEMENT OF WINNERS: October 16, 1995

AWARDS CEREMONY: February 6, 1996 at the *CIO* Enterprise Value Summit

DO YOU QUALIFY FOR AN ENTERPRISE VALUE AWARD? THREE CRITERIA ARE ESSENTIAL...

1. The pervasiveness of information technology —in other words, the strategic objective could not have been met without IT's contribution
2. A return of value to the enterprise (see Defining Value within this application form)
3. A partnership between an IT and business executive

If your innovative solution meets the above criteria, please fill out this Enterprise Value Awards application form. The February 1, 1996 issue of *CIO* will feature profiles of the winning organizations and the executives who have proven their strategic technology investments have had a positive and sustained impact on enterprise value.

On February 6, 1996 CIO will host a special awards ceremony honoring the winners at the annual *CIO* Enterprise Value Summit. If you would like to learn more about the *CIO* Enterprise Value Awards program, please call Tracey Grogan at (508) 935-4449.

1. COMPANY/BUSINESS UNIT

▲ NAME OF PARENT COMPANY

CITY, STATE WHERE HEADQUARTERED

PUBLICLY HELD? PRIVATELY HELD?

ANNUAL REVENUES

INDUSTRY

NAME OF BUSINESS UNIT OR ORGANIZATION

CITY, STATE WHERE LOCATED

NUMBER OF EMPLOYEES AT BUSINESS UNIT

2. ENTRANTS

A.

▲ NAME OF ENTERING I.S. EXECUTIVE

TITLE

NAME OF DIVISION, DEPARTMENT OR UNIT

ADDRESS

CITY

STATE ZIP

( ) ( )
TELEPHONE FAX

B.

▲ NAME OF ENTERING BUSINESS-UNIT EXECUTIVE

TITLE

NAME OF DIVISION, DEPARTMENT OR UNIT

ADDRESS

CITY

STATE ZIP

( ) ( )
TELEPHONE FAX

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent suppliers, customers or others intimately familiar with the system.

A.

▲ NAME

TITLE

( ) ( )
TELEPHONE FAX

REASON FOR INCLUSION

B.

▲ NAME

TITLE

( ) ( )
TELEPHONE FAX

REASON FOR INCLUSION

C.

▲ NAME

TITLE

( ) ( )
TELEPHONE FAX

REASON FOR INCLUSION

D.

▲ NAME

TITLE

( ) ( )
TELEPHONE FAX

REASON FOR INCLUSION

DEADLINE:
JULY 1, 1995

MAIL TO:

ENTERPRISE VALUE AWARDS
CIO COMMUNICATIONS INC.
492 OLD CONNECTICUT PATH
PO BOX 9208
FRAMINGHAM, MA 01701-9208

4. The Nominated Organization

Please tell us about your organization (company, business unit, agency) in 500 words or less. Include information on:

- when the organization was founded;
- mission statement;
- major products and services;
- markets served;
- any other data you believe to be relevant in terms of general background.

5. The Nominated System

Tell us about the nominated system and demonstrate its importance to the organization by completing the following sections. Please limit your material to five pages.

- **Objective:** Identify the primary business objectives of the IT investment.

- **Scope and Impact:** Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business. Identify other business-change initiatives tied to the IT investment.

- **Added Business Value:** Describe how the technology investment is furthering the organization's strategic objectives, including any new business initiatives. Note any significant event that would help us evaluate the nominated system's value. Examples might include a merger, a new distribution channel or a significant regulatory change.

- **The Importance of IT:** Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

- **Collaboration:** Describe how the business unit and IS organization worked together throughout the project—from concept to implementation. What were the specific tasks fulfilled by the business unit? IS organization?

6. Quantifying ROI

Please provide a detailed summary of the nominated system's investment costs (including all up-front development expenses and annual maintenance charges) and its ROI to date. Include reasonable estimates of indirect and /or "soft" benefits.

7. Technical Profile

Briefly describe the technology of the nominated system. Please include the names of major vendors and products. If you prefer, you may attach a document containing a technical description of the system, providing it is no more than five pages.

NOTE: The examples provided here are meant to be illustrative, not all-inclusive:

- Architecture (e.g., client/server, distributed, mainframe)
- Hardware (e.g., mainframe/parallel processor, minicomputer/server, desktop computers, handheld/portable devices)
- Software (e.g., operating systems, database system, shells, application software)
- Software development tools (e.g., CASE, 4GLs, GUI developers, object-oriented development tools)
- Networking/communications hardware, software and services (e.g., modems, routers, electronic-mail packages, carriers and public networks)

8. Truth of Information/Release

The following release must be signed by both nominating executives if the application is to be considered. *Unsigned releases will invalidate the entry.*

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the Enterprise Value Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for *CIO* Magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

1. ______________________________

▲ SIGNATURE OF NOMINATING I.S. EXECUTIVE

____

DATE

2. ______________________________

▲ SIGNATURE OF NOMINATING BUSINESS EXECUTIVE

____

DATE

9. Other Editorial Opportunities

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in *CIO* Magazine? **Yes** ☐ **No** ☐

How did you learn about the Enterprise Value Awards program?

☐ *CIO* Magazine
☐ Consultant
☐ Systems Integrator
☐ PR Agency
☐ Advertising Agency

☐ Academician
☐ IS staff member
☐ Other publications
☐ Vendor
☐ Other (please identify) ______________

CHECKLIST

Have you filled out...?

☐ Company/Business-Unit, Entrants and Supporters Information

Have you included on separate pages...?

☐ Nominated Organization
☐ Nominated System
☐ Technical Profile
☐ Additional Return on Investment Material

Have both entrants signed and dated...?

☐ Truth of Information/Release

Have you checked off...?

☐ Other Editorial Opportunities
☐ How you learned about the Enterprise Value Awards program?

CONGRATULATIONS TO LAST YEAR'S WINNERS

APCOA, INC.

Paul R. Langes
Director, Systems & Technology

G. Walter Stuelpe, Jr.
President & CEO

CATERPILLAR

Robert J. Hoffe
Information Services Manager
Engine Division

George E. Curry
Customer Services Manager
Engine Division

THE COMMONWEALTH OF MASSACHUSETTS

John Thomas Flynn
Chief Information Officer

William Kilmartin
Comptroller

HYATT HOTELS & RESORTS

Gordon S. Kerr
Senior Vice President of MIS

John W. Biggs
COO of Regency Systems Solutions

KMART CORPORATION

David M. Carlson
Senior Vice President
of Corporate Information Systems

David Wegscheid
Divisional Vice President
of Merchandising

PCS COMPLEAT

William C. Brown
Executive Vice President

Gordon B. Hoffstein
Chairman & CEO

The Enterprise Value Awards

Honoring executives who craft
innovative information technology solutions
to enhance business value

CIO

Step into the Spotlight

CIO'S ENTERPRISE VALUE AWARD GETS YOU ALL THREE.

The Enterprise Value Awards
The Award for Innovative IT Solutions

The value of IT. It's real. You know it and you've proven it. Your organization is actually realizing business value and hard-dollar benefits from information technology systems. And you were the champion, the architect, the strategist. We want to recognize your contribution to the enterprise.

So CIO created the *Enterprise Value Awards* to honor those executives using innovative IT solutions to bring about real business value.

If you can demonstrate the strategic value and increased bottom-line profits as a result of an information technology solution, we want to hear about it. We urge you to participate by filling out the *Enterprise Value Awards* application form bound in this issue of *CIO*. If the entry form has been removed or you require additional information, please call Tracey Grogan at (508) 935-4449.

Get the recognition you deserve.

The Enterprise Value Awards℠
Honoring executives who craft innovative information technology solutions to enhance business value

CIO

CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, MA 01701

TRENDLINES

REALITY CHECK

If all the talk of disaster on Page 14 has you shaking in your boots, a free service offered by Comdisco Inc. can help you determine just how much you have to fear.

The disaster-recovery services provider has developed a two-page self-assessment tool to evaluate companies' vulnerability to disaster. To determine your company's potential exposure, call 800 272-9792 to receive the questionnaire; return the completed form to Comdisco, and you'll receive a copy of your company's vulnerability index in the mail, along with industry averages for comparison.

NEW VENTURES

Harvard Business School Publishing has taken a major step toward providing just-in-time executive enlightenment with the creation of its New Media Group, dedicated to developing multimedia products for management training and reference.

The division, based in Cambridge, Mass., combines editorial content from the publisher with emerging technologies to deliver high-quality leadership and business material on the desktop. The New Media Group's first release, *Becoming an Effective Manager Interactive*, is a CD-ROM-based multimedia program that offers training on demand, including background resources such as case histories. The text is supplemented by a database of relevant *Harvard Business Review* articles, audio commentary and video clips of case-study participants. The clips are especially valuable, according to the publisher, because they capture significant visual cues an ordinary transcript might miss.

***Becoming an Effective Manager* comes in versions for IBM-compatible PCs and the Macintosh. The program, which is currently being used at a number of preselected sites, including AT&T, Coopers & Lybrand and McDonald's, will be available in September. For more information, call 617 496-6384.**

EVENTS

Network World Unplugged:
The Anywhere, Anytime Computing Conference and Exposition
April 11-13
New York Hilton and Towers, New York
IDG World Expo
800 225-4698

This conference will explore how professionals cope with changing workforce demographics, new business requirements and innovative technologies. The program includes five in-depth tutorials and 12 conference sessions. Registration: $995

ABUI Spring '95 International Conference
Strategic Networking Solutions for Your Business
April 23-26
Buena Vista Palace, Orlando, Fla.
Association of Banyan Users International
800 730-ABUI

Attendees learn how to manage evolving networks and produce results in dynamic environments. Sessions will provide information on scalable solutions for networks, enterprisewide application delivery and integrating third-party products. Registration: $495-$895

DVC '95 West
Desktop Videoconferencing Conference
May 2-4
Hyatt Regency, San Francisco Airport, Burlingame, Calif.
408 778-1994

This technical forum focuses on the technology and infrastructure required to implement desktop-videoconferencing systems. Issues addressed will include document sharing, data applications and real-time audio. Registration: $1,950

GOING FOR BROKERS

While the future for investing in interactive technology appears bright, the future for investing *through* interactive technology is even brighter. Interactive investing will be one of the first highly profitable applications for home PCs and online services, beating out other financial services like mass-market PC banking, according to Forrester Research Inc. of Cambridge, Mass.

Online investing will grow from fewer than 500,000 accounts today to more than 1.3 million by 1998, according to William M. Bluestein, the market-research firm's research director of people and technology strategies. That will create a market in which "a technology elite will use interactive technologies to win business away from rivals," he says. "Discount brokers and mutual-fund providers will wield the PC as a weapon to undercut full-service brokerage firms."

Forrester sees four camps of vendors driving this emerging market: transaction players like Fidelity, Charles Schwab and DST; financial-content providers like Dow Jones, Reuters and Motley Fools; networking companies like America Online; and software vendors such as Microsoft, Intuit and Meca.

"In 1995, the industry will see a major push for interactive investing through private-label and commercial online services," says Bluestein. Of the companies Forrester interviewed for its report, eight will deploy their own branded services this year, four will roll out complete systems in conjunction with online-service providers and five will develop more-limited World Wide Web servers. For information, call 617 497-7090.

"I Need to Get My Files Off the Server!"

Each time a new network protocol arrives on the market, it has been up to you to ensure a transparent integration between your current environment and this new one.

The newer protocols may have created more problems than solutions. Networks, for instance, aren't always available when you need to get on them. Delays in service occur. And just as troublesome, variations in delay. Even loss of data.

Is this what anybody had in mind? Hardly. And yet, you need to keep everything and everyone connected and running smoothly for your company to stay in business.

Ascom Timeplex has developed an internetworking architecture that lets you integrate SNA and LAN data into a single network with absolutely no compromise in quality and service.

It's called Express Routing™. It allows you to prioritize individual data streams, making it a bandwidth-efficient, high-performance alternative to many other infrastructures. It's easily managed and remarkably simple to install.

Express Routing is a product of Ascom Timeplex, global provider of corporate-wide internetworking solutions to the world's most demanding organizations for over 25 years.

Call us and we'll show you how to get more from your network today. Call for information now.

EXPRESS ROUTING LETS YOU INTEGRATE SNA AND LAN TRAFFIC ON A SINGLE NETWORK, WITHOUT COMPROMISE.
EXPRESS ROUTING
SNA
NETBIOS
IPX
IP

Express Routing™

ascom Timeplex
Connectivity Without Compromise.

400 Chestnut Ridge Road
Woodcliff Lake, NJ 07675
Tel: 1-800-669-2298
Fax: 201-391-5766

Ascom Timeplex and Express Routing are trademarks of Ascom Timeplex Trading AG. Other trademarks are the property of their respective owners.

Migration Plans

Microsoft's new operating system will require significant training and support. With 50 million copies of Windows 95 expected to ship in the first year, CIOs had best be prepared.

BY WILLIAM KIRWIN

Since the early 1980s, the PC market has been split between two types of operating systems. On one side are the volume operating systems—DOS, Windows, Windows for Workgroups—which win the support of independent software vendors (ISVs) and users but lack robustness and stability. On the other side are the robust and stable operating systems—OS/2, Unix, Windows NT—which boast superior features and strength but lack the ISV support needed to propel them into the mainstream.

When Windows 95, Microsoft Corp.'s next-generation operating system, makes its expected debut in August, it will be as a robust desktop platform that appeals to end users and ISVs. Windows 95 is a 32-bit operating system with memory protection, multithreading, integrated networking and preemptive multitasking—the same features that make OS/2 and Unix robust. However, where OS/2 and Unix have struggled to attract ISV support, Windows 95 will instantly build on Microsoft's installed base and extraordinary clout with developers and ISVs as well as end users. It promises to be an operating system that runs general-purpose commercial applications and mission-critical in-house applications with equally high performance.

For IS executives, the Windows 95 challenge begins now. Microsoft will take a bottom-up approach, pushing the operating system into corporations through the vast base of end users. In effect, Microsoft will launch Windows 95 beneath the official radar screen of IS budgets, technical-support programs and user-training plans. Fortunately, IS executives have time to prepare—which they must do or else lose any say or influence over what could be the largest software transition to hit end-user computing.

Microsoft's tactics with Windows 95 will be called marketing savvy by some and strong-arming by others. Microsoft plans to ship 50 million licenses during the first year of Windows 95's availability—volume that can be achieved only by halting sales of Windows 3.1 within three to six months of Windows 95's release. The withdrawal of Windows 3.1 will immediately force three ac-

Windows 95 Upgrade Costs for 1,200 Users

	UNIT COST	ENTERPRISE COST
OPERATING SYSTEM UPGRADE COSTS		
Administration Costs		
Windows 95 Upgrade Cost	$50	$60,000
Purchasing Department Labor (six hours)	$35	$210
End-User Costs		
End-User Installation (1 hour per user)	$50	$60,000
End-User Training Labor (8 hours per user)	$400	$480,000
Support Department Costs		
Product Review and Introduction (400 person-hours)	$50	$20,000
Hot Line Support Calls (360 person-hours)	$35	$12,600
TOTAL WINDOWS 95 UPGRADE COST		**$632,810**
APPLICATION UPGRADE COSTS		
Administration Costs		
Application Upgrade Cost (3 applications @ $100 each)	$300	$360,000
Purchasing Department Labor (12 hours)	$35	$420
End-User Costs		
End-User Installation (1.5 hours per user)	$75	$90,000
End-User Training Labor (7 hours per user)	$350	$420,000
Support Department Costs		
Product Review and Introduction (150 person-hours)	$50	$7,500
Help Desk Support Calls (150 hours)	$35	$5,250
TOTAL APPLICATION UPGRADE COST		**$883,170**
TOTAL ENTERPRISE UPGRADE COST		**$1,515,980**

SOURCE: GARTNER GROUP

EDITOR'S NOTE

With this look ahead to the delivery of Microsoft Corp.'s Windows 95, we begin a series of briefings authored by Gartner Group on what CIOs should know and do about assorted technology developments. We look forward to hearing what you think about this new column. Please contact CIO *Executive Editor Lew McCreary at 508 935-4618 or* ciomag@mcimail.com.

tions: PC vendors will have to bundle Windows 95 on new PCs, users will have to upgrade directly from DOS to Windows 95, and IS executives will have to develop viable transition plans several months before the software appears. Windows 95 represents more than a single straightforward migration. It will involve a series of continuous migrations, including upgrades of hardware, applications and utility software. Upgrade costs are no trivial concern (see chart, Page 24).

These migrations—combined with Windows 95's intrinsic complexity and new user interface—will put tremendous pressure on technical-support groups. Moreover, they will increase the hidden costs of end-user operations as underground support networks emerge or expand. Unless IS executives seize control through aggressive contract negotiations and credible enterprisewide migration plans, they will find Microsoft—not the IS organization—at the controls.

> **In effect, Microsoft will launch Windows 95 beneath the official radar screen of IS budgets, technical-support programs and user training plans.**

IS executives should start addressing the factors that will either ensure or inhibit successful migration to Windows 95. Gartner Group identifies some pertinent issues that should be considered:

End-user expectations: As the Windows 95 banner unfurls, industry players will tout their Windows 95-based computers and applications in advertisements and seminars. Meanwhile, the press will play up the Windows 95 story. After all the hype, the IS organization will have the formidable responsibility of reining in and resetting end-user expectations. IS executives must develop a countercampaign that educates end users, filters out the hype and reports regularly on the progress of the in-house transition.

Support: To prepare for the onslaught of Windows 95, the IS organization should adopt a portfolio approach to managing PC system software and applications. A portfolio approach can eliminate technical activities that add little value to the support process—or else permit those activities to be assigned to outsourcing vendors, thereby enabling IS executives to reallocate resources to the high-value activities surrounding Windows 95. IS executives may want to hire outsourcing

Over 750 **blue chip companies have adopted Hyperion software.**

So we're adopting the name for our company.

Hyperion
software

IMRS is now Hyperion Software.

The new name to remember for all your financial software.

Total Upgrade Cost Comparison (Price Per User)

	WINDOWS 3.0 TO WINDOWS 3.1	WINDOWS 3.1 TO WINDOWS 95
Operating System	$267	$527
Applications	$477	$736

SOURCE: GARTNER GROUP

companies for software installations, hardware upgrades, PC relocation, legacy software support, peak-demand and after-hours coverage, and specialized software support. They should soon begin negotiating with outside companies to ensure timely access to services once Windows 95 debuts.

Training: Windows 95's new interface makes end-user training a critical aspect of managing the technical-support burden. However, offering every user the same orientation class is a setup for failure. Training should be segmented by the operating-system platforms from which users are migrating. Moreover, classroom training should be complemented by just-in-time training and other education techniques. Finally, continuing education can be offered through lunch sessions, short classes, newsletters and "quick tip" messages. Some information can be broadcast via electronic mail or voice mail.

Management infrastructure: the installation of and upgrade to Windows 95 demands a robust infrastructure for management and support. Automated initiatives will emerge or start to mature as Windows 95 rolls out. The IS organization should exploit tools for electronic software distribution, asset inventory, software-license management and diagnostics. Automated tools free IS personnel for high-value activities. Furthermore, installing the tools during the Windows 95 rollout will save time and money, since the client-side components can be loaded at the same time the Windows 95 upgrade is performed.

The Gartner Group Personal Computing service has developed a cost-analysis model to help information executives plan for the upgrade to Windows 95. The model assumes an enterprise of 2,000 PC users, with 1,200 upgrading from Windows 3.1 to Windows 95.

Comparative costs: An upgrade from Windows 3.1 to Windows 95 will place greater demands on support organizations than an upgrade from Windows 3.0 to Windows 3.1, largely because of Windows 95's complexity, user interface and device

Now, **accounting software that works as well as the most successful financial reporting software.**

Introducing

Hyperion Financials

An integrated client/server solution for financial management to drive your business into the next century.

drivers for graphics, communications, sound and video. For example, support organizations will require approximately 400 person-hours to test and qualify the system and drivers in the enterprise-supported environment and to train hot-line support personnel on the new features.

Enterprisewide costs: Although the basic use of applications will change little with Windows 95, the operating system introduces a new user interface and more-advanced functions—for example, the exploitation of Microsoft's Object Linking and Embedding 2.0. Each user will likely require five hours of training and plenty of help-desk handholding to learn the new features (see chart, Page 24). The cost-analysis model assumes that 40 percent of the users will place three 15-minute calls to the help desk. The model also assumes that the hypothetical enterprise has five corporatewide applications, three slated for upgrade during the Windows 95 upgrade cycle. For Gartner Group's sample enterprise, the cost of upgrading 1,200 user desktops from Windows 3.1 to Windows 95 will be $632,810; the cost of upgrading applications will be $883,170 (for a total enterprise upgrade cost of $1,515,980).

With the release of Windows 95 still some months off, companies have some time to prepare for Microsoft's end-user marketing pitch, the heavy support burden and the complicated cost picture. In the meantime, we urge all IS executives and end-user computing managers to do the following:

- Establish a migration plan with timing milestones to retain control of the transition to Windows 95. Otherwise, Microsoft will penetrate the corporate asset base beneath the official radar screen of IS budgets and technical-support programs.
- Establish a sound technical infrastructure and develop a committed program of training for IS personnel and end users. By anticipating Microsoft's direct sell to end users, IS executives can plan technical support and ensure a successful migration to Windows 95.
- Plan an adoption strategy specific to the enterprise. Organizations that want to adopt Windows 95 on their own terms and at their own pace should negotiate now with Microsoft and with the PC hardware vendors. Otherwise, Microsoft will push Windows 95 into the enterprise at its pace, not the pace best for the enterprise. CIO

William Kirwin is vice president, management of IT, at Gartner Group, a market research and consulting firm in Stamford, Conn.

A financial system that reflects the way you do business.

Flexibility to meet the toughest business challenges.

Immediate on-line access to any view of your business, anywhere in the system.

Significantly more productive than current systems. Fast installation. Easy maintenance.

You'll need fewer reports and spend less time preparing each one.

More efficient accounting. More time for analysis.

Hyperion ledger

Hyperion tools

Hyperion reporting

Hyperion payables

Hyperion admin

Hyperion software

The new name to remember for all your financial software.
For more information call Carolyn Simon in Stamford, Connecticut.

1·800·286·8000

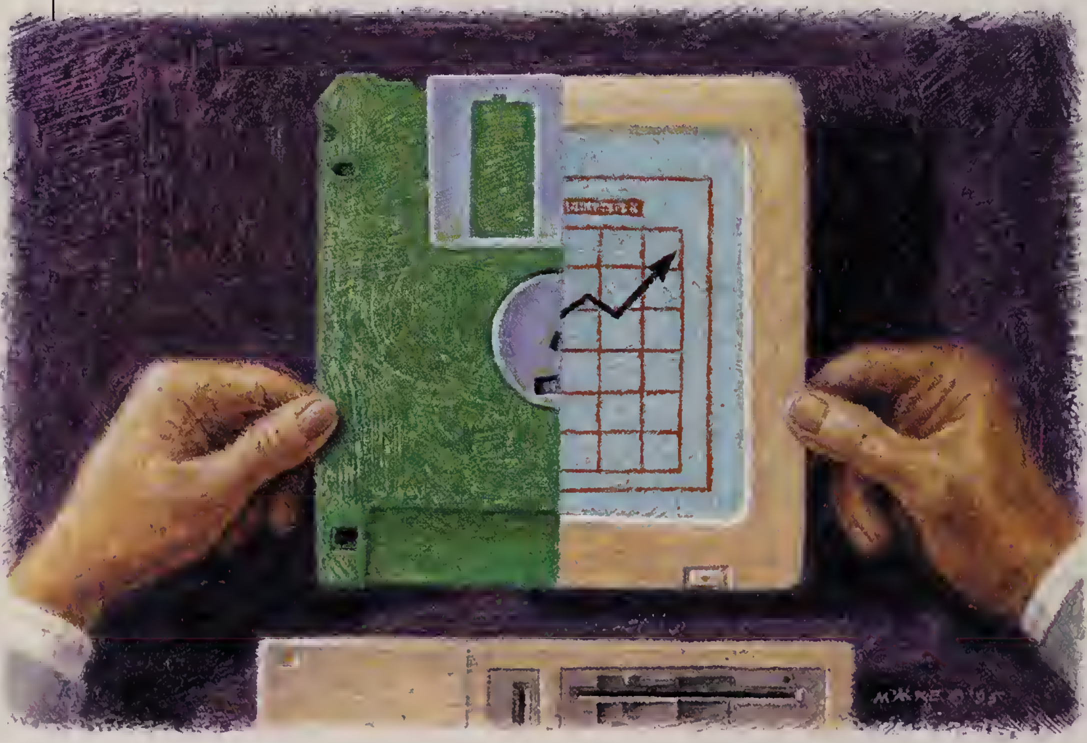
They Also Serve

Not all IT-driven change emerges from the IS organization. Increasingly, valuable hybrids who know how to think about a business with technology's capability in mind are being deployed throughout the organization.

BY ROBERT F. MORISON

Organizational structure is an issue that has long bedeviled IS. Should IS be a centralized function for the sake of companywide coordination and economies of scale? Should IS mirror the decentralized structure of its customer units for the sake of working close to the business? The answer to both questions is clearly "yes," and therein lies the challenge.

The evolving structure of IS in large companies is driven by a dominant trend: IT and the ability to use it are permeating organizations. IS is no longer the sole or default or even primary supplier of everyday IT-related expertise. The distinctions among system builder, system supporter and system user are disappearing fast. Being a "partner" with the business increasingly means being a "teammate" in performing business, as opposed to exclusively technology, work. With the blurring of these old distinctions comes a blurring of organizational affiliation: Who belongs to "IS"?



The only way to answer this question is to get down to specifics. Forget today's titles and organizational affiliations. The people who should form the core of IS and its leadership are people we call "business technologists," a very valuable hybrid. They know how to think about a business with technology's capability in mind, and they know how to work the organization to make productive change happen. How do we deploy these business technologists? Or, in the vernacular, "Who does what to whom?" Our research has shown four basic patterns of deployment:

1 Some business technologists perform information- and technology-management processes on behalf of the business at large. These processes include designing the computing and communications infrastructure and modeling the business through the creation of shared software objects. These people perform the work that must clearly be managed from a central perspective in order to achieve coordination and scale. They have deep technology expertise, they tend to specialize, and they are part of the organizational entity called "IS."

2 Some business technologists perform information- and technology-management processes on behalf of the owners of business processes, such as the heads of product development, order fulfillment and customer service. These people are analogous to the departmental IS units that many companies established when they decentralized systems development and support, but with several crucial distinctions: They work for the owners of broad, cross-functional business processes rather than functional departments; they focus on improving these pro-

ILLUSTRATION BY MIKE HODGES

WHEN YOU READ

FOUNDATION® software has proven itself thousands of times

BETWEEN THE LINES

as the complete solution for building high performance applications.

YOU'LL REALIZE THAT

The **FOUNDATION** family of methodology tools,

OTHER POPULAR

design tools, message-based architecture and repository,

DEVELOPMENT TOOLS

make "on-time" and "on-budget" obtainable goals.

CAN BE A RISKY CHOICE

It's worth your time to find out about the many new features

FOR BUILDING

of **FOUNDATION** products for building applications that must work.

LARGE APPLICATIONS.

CHOOSE **FOUNDATION®**

Please mail completed coupon, reply by fax (312) 507-0802 or call (800) 458-8851.

FOUNDATION™

☐ Please send me product literature regarding **FOUNDATION**, the low-risk choice in a high-risk environment.

☐ I'd also like to receive your white paper regarding client/server methodology.

NAME TITLE

COMPANY

ADDRESS CITY

STATE ZIP TELEPHONE / - FAX / -

Mail to: Andersen Consulting, Attn: Allyson Holmes, 33 West Monroe Street, Room 214, Chicago, IL 60603-5302

FOUNDATION is a registered trademark of Andersen Consulting. ©1995 Andersen Consulting. Arthur Andersen & Co., S.C. All rights reserved.

CIO

ANDERSEN
CONSULTING
Software Products

cesses rather than simply supporting everyday technology users; and rather than specializing, they tend to perform a range of work, including both systems development and technology introduction. These people are versatile, they focus on business results, and they may or may not be part of IS.

3 Some business technologists perform basic business work (such as customer service) and, as a component of their jobs, support the information and technology needs of their teammates. The mix of "business" and "technology" work can vary greatly. If the business work requires specialized expertise (for example, a graduate degree in mechanical engineering), the business technologist may perform very little of it; this type of teammate supports the engineering team's computer-aided design platform and coaches people on how to use it. If the business work is more general (for example, telephone customer service), the business technologist may spend most of his or her time doing it, while on call to provide systems support. The key under both circumstances is to have business technologists experience rather than just observe the business work. These people typically do not need deep technological expertise, they focus on service, and they are unlikely to belong directly to IS.

4 Some business technologists run information-intensive and IT-intensive business processes. They don't support them, but manage them directly. Many business processes should be managed by strong business technologists. These are processes that center on manipulating and interpreting relatively uncomplicated information, and that do not require deep and specialized expertise (that is, no master's in electrical engineering required). Many such processes (for example, order fulfillment) carry the labels "paper intensive" and "back office." Other candidates (for example, market research) boast a more positive image but still meet the criterion of being basically forms of information processing. In this scenario, business technologists with managerial talent become the owners of non-IS business processes, and often these business organizations merge with "IS."

This last pattern—IS merging with information-intensive business processes—is the newest and, in many ways, the most exciting. With increasing regularity, companies are realizing that the key to reengineering these processes, slashing their cost structures and elevating their service levels is to shatter the status quo. Instead of letting the paper-bound back office play "customer" to IS and, in effect, restrict the transformational impact of IT, let those who are expert in technology and its business application manage and redesign the business work. When "us" and "them" becomes "we," the road to meaningful change becomes much more navigable.

When "us" and "them" becomes "we," the road to meaningful change becomes much more navigable.

A pharmaceuticals firm has merged market research with IS, the better to make its marketplace information an active force (rather than a historical record) for the business. The new organization still has separate and distinct IS and market-research roles, yet it also includes a cadre of business technologists whose role is a true hybrid: They build the mathematical models and systems for manipulating sales and marketing data, and then analyze that data. The hybrid department works well—it contains a mix of IS and market-research people, and the IS management systems (for performance appraisal, for example) have transferred easily. Indeed, the company is talking about migrating other functions toward this model.

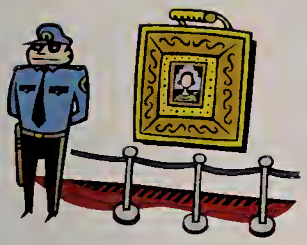
Meanwhile, a large regional bank has merged its 2,800-person back-office transaction-processing units with IS to eliminate unnecessary work, upgrade systems and technology, and reengineer basic processes such as customer service. IS's close relationship with the company's product units has enabled it to draw operations—which previously languished in tension-filled isolation—into cross-functional teams, each offering the best people from IS and operations, and the product units have responded enthusiastically. Ironically, the merger depended little on IT, other than some long overdue automation improvements; rather, it was IS management's experience in process improvement and its close relationship with the business units that has brought the most benefits.

CSC Research's most recent survey of IS managers at 782 North American and European companies indicates that 10 percent of IS organizations are considering or committed to such organizational mergers today. And this trend will accelerate as businesses redefine themselves around processes, rethink the essence of their work and seek the means to cut costs while improving performance.

These internal organizational mergers are a means of driving business reengineering. They are also a step toward establishing the right mix of business-technologist talent in "user" organizations.

But above all, they are the means of deriving an enormous amount of short-term value from the leadership potential of selected business technologists. Mergers like these tap more than information and technology expertise; they tap the cross-functional, systems-thinking, business-results-oriented management talent of the leadership of IS. CIO

Robert F. Morison is a vice president of CSC Research and Advisory Services based in Cambridge, Mass., and the director of CSC Genesis, a new CSC research program dedicated to discovering and developing groundbreaking business and management practices.



INVESTMENT PROTECTION

Only AS/400 will let you add 64-bit RISC technology while protecting all your current software.

(If only all your valuables could be that secure.)

(If it's any less secure, it isn't AS/400.®)

Builds on your investment:

Connects easily to all your existing hardware.

Updates your investment:

Plug in new technology without overhauling your entire system.

An easy-to-acquire investment:

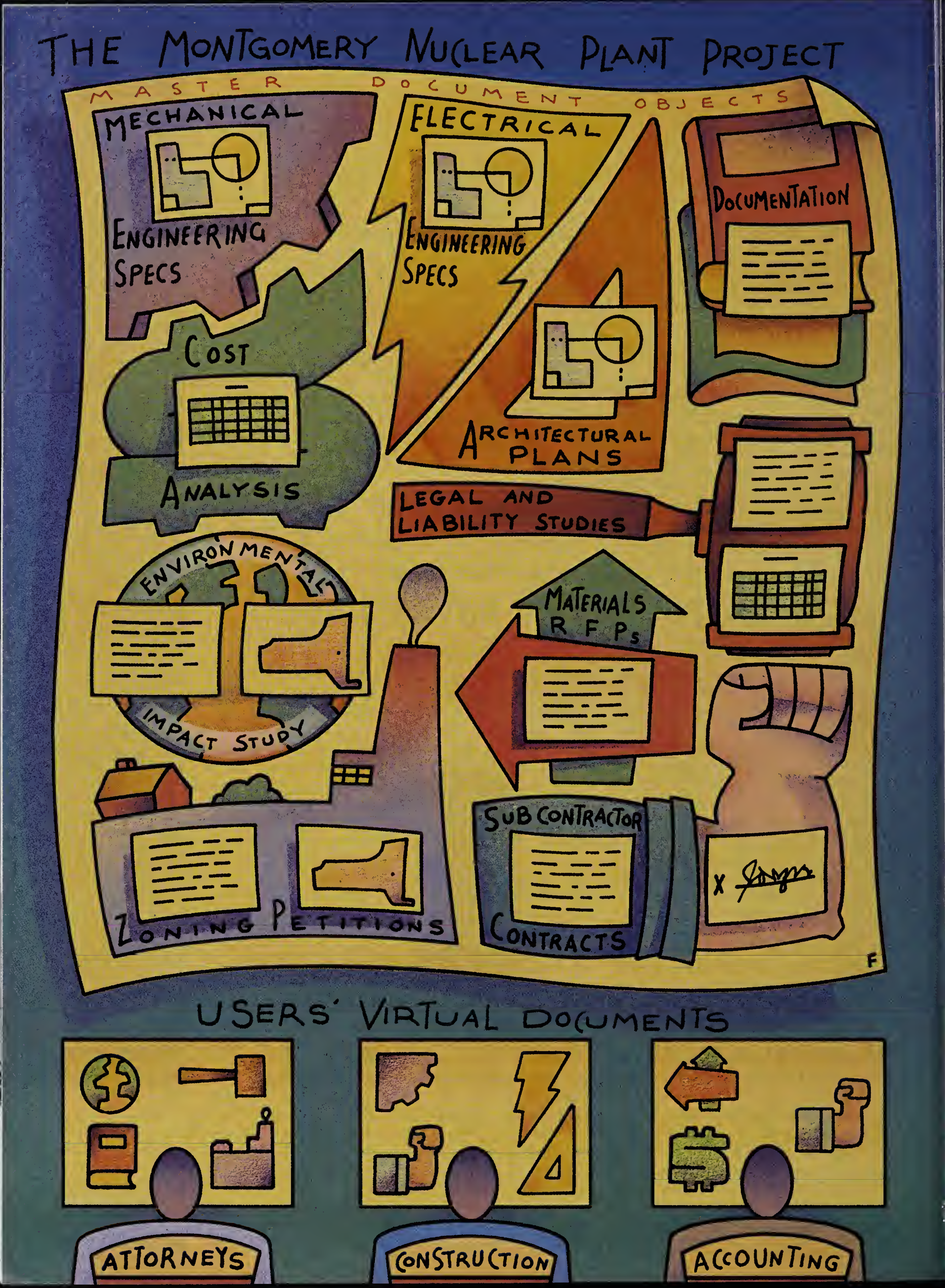
Lease AS/400 through IBM Credit Corp.

Unbeatable investment:

For a free advanced application architecture brochure, call 1 800 IBM-6676 (x614).

IBM®

IBM and AS/400 are registered trademarks of International Business Machines Corporation. All other products and/or company names are trademarks or registered trademarks of their respective companies. © 1995 IBM Corp.


THE MONTGOMERY NUCLEAR PLANT PROJECT
MASTER DOCUMENT OBJECTS
MECHANICAL
ENGINEERING SPECS
ELECTRICAL
ENGINEERING SPECS
DOCUMENTATION
COST
ANALYSIS
ARCHITECTURAL PLANS
LEGAL AND LIABILITY STUDIES
ENVIRONMENTAL
IMPACT STUDY
MATERIALS RFPs
ZONING PETITIONS
SUB CONTRACTOR
CONTRACTS
X
F
USERS' VIRTUAL DOCUMENTS
ATTORNEYS
CONSTRUCTION
ACCOUNTING

THE VIRTUES OF Virtual Documents

Kindergarten wisdom holds that selfish is naughty and sharing is nice. But with virtual document management, businesses can have it both ways. By dividing master documents into reusable objects, customized documents and information sharing are no longer mutually exclusive.

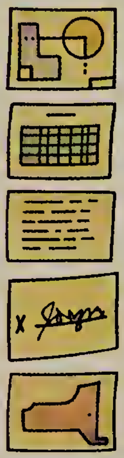
BY RICHARD PASTORE

The street lights are still burning, and even the *Journal* hasn't arrived yet as the team manager plunks down at her workstation. The Montgomery Nuclear Plant project is too important to stroll in at her usual 9 a.m. The last-minute changes to the mechanical-engineering specs must be reconciled with the user documentation. Logging onto the network, she calls up the Montgomery file—and nothing happens. "No such file found," the system smugly notes. That can't be! Four months of work wiped out? She awakes in a cold sweat as her alarm clock calls a halt to the nightmare.

If this fictitious manager's anxiety-induced dream hadn't been interrupted, she might have remembered that, in fact, there no longer is a "Montgomery file." Under the company's new document-management system, information about the Montgomery project now exists only as a "virtual document," a collection of individual objects—pieces of reusable information—indexed and stored throughout the system. A complete, static document does not exist. Users must call together an assemblage of pertinent

OBJECTIVE SOURCES

Virtual-document objects can be created in more than one application tool. Here is a key to the origins of the Montgomery Project objects.



CAD Drawing

Spreadsheet

Word Processing

Image

GIS Maps

ILLUSTRATION BY MARK FISHER

Documenting The Features

Today's key features of networked document-management solutions

No longer is electronic document management seen as a discrete tool for storage and retrieval or simple library management. In users' minds, functionality has broadened to span the entire life cycle of a document between creation and output. And features increasingly reflect the need to integrate with other products and functions. EDM features now available include:

- Check-in/check-out library management
- Version control
- Full-text retrieval
- Attribute management
- Modularly structured documents/configuration management
- Text language translation
- Multilevel security
- Multiplatform support
- Industry standards compliance
- Open APIs for integration
- Management for files created outside of an EDM system
- Document database
- Document compare and annotate
- Viewing
- Data retrieval
- Image integration
- Workflow integration
- Mobile user support
- HTML conversion capabilities (for Internet dissemination)

Source: "Electronic Document Management: Navigating the Flood of Information," International Data Corp.

objects to create a virtual version of the document that best suits their purposes at any given time. With a couple of access commands, a security clearance and the automatic launch of a few embedded links, the team manager could have created a customized version of the Montgomery document composed only of the problematic documentation and specs. And perhaps her nightmare would have transformed into a document-management dream.

Over the last year, the emergence of the virtual document is probably the most prominent trend in electronic document management (EDM), which is itself gaining greater recognition for its strategic value. Transcending its 1980s association with image processing and "electronic file cabinets," EDM today is increasingly seen as the best way to gain control over the strategic information assets locked up in documents.

> Despite the cyberesque overtones of the term, the virtual document is rooted in down-to-earth common sense. The concept: divide a document into its logical components and manage these "objects" instead of the whole.

Management of documents and the unstructured data they contain has historically gotten scant attention. "We've solved the problem of managing structured data with relational databases. But most of the information we work with is not in database format; it's in documents," says Frank Gilbane, publisher of the *Gilbane Report*, a newsletter on document management based in Cambridge, Mass. "That part we don't manage."

But this is changing as it becomes more apparent that EDM can play a major role in facilitating today's strategic-management practices. "It's what you need in order to enable true collaborative work on a document and have the most recently updated information accessible to people all the time," Gilbane says.

EDM is best defined by its functionality. The basic ingredients are storage, retrieval and searching capabilities. More-sophisticated, "library-type" functions include regulated check-in and check-out of documents from repositories, which provides for version control. EDM will also automate security controls that permit read-only or edit access for individual users or teams. For a growing number of users, EDM has also incorporated automatic document routing via workflow software, as well as esoteric functions such as language translation and formatting for dissemination over the Internet (see box at left).

Despite the cyberesque overtones of the term, the virtual document is rooted in down-to-earth common sense. (Indeed, many say it's been around in one form or another for years.) The concept: divide a document into its logical components and manage these "objects" instead of the whole. Applying EDM capabilities to objects enables reusability, reduces the need for inefficient data reentry and increases flexibility of user access. Further, there may no longer be a need to manage the master version of a document or even to store it as a whole. It's the objects that drive the process.

Virtual documents help users make decisions more efficiently because the users can assemble customized documents containing only the subset of information objects that are pertinent to them. "It lets each user or workgroup see the document the way they need to see it to get their work done. The document format and content can vary [from

Interested in decision support? Here's your choice:

The company that pioneered it.

Or somebody that's still learning about it themselves.

We offer MPP. SMP. And a 10-year track record.

Maybe that's why 220 of the world's top companies are already working with us.

We didn't just announce decision support. We invented it.

Our clients include the three biggest retailers in the U.S. Six of the top eight banks. Six leading regional phone companies.

Altogether, we provide over 80% of the world's commercial parallel processing.

We're the one company with the technology, experience and service support to help you turn summary transactional data into detailed information.

In any form. Any quantity. And from any number of locations.

Information which can be used by your executives, marketing, product development, distribution and salespeople. To cut product development time. Reduce markdowns, overstocks and understocks. And become super-responsive to customers.

MPP. SMP. And a 10-year track record.

Lately, other manufacturers have announced their own decision support strategies.

But of all the information companies out there, we're the ones who offer both massively parallel processing and symmetric multiprocessing.

Not some day. Today.

And all our systems are totally open and completely scalable. Based on industry-standard components like Intel® microprocessors.

So you can get into decision support at any level. And grow as your needs grow. Without having to change architectures.

Choice of database solutions.

To help you get the most out of decision support, our systems run your choice of industry-leading parallel databases. From Oracle®, Sybase®, and Informix®.

As well as our own Teradata® database. With over 13 years of design, development and field experience behind it.

Get IT. Move IT. Use IT.™

No other company can help you with a total decision support solution like we can.

We can help you Get data from legacy databases, point-of-sale, PC LANs, you name it.

Move it. By LAN, WAN, fiber optics, satellite. To where it can be warehoused, crunched and cross-referenced with other data.

Then help you Use its insights. Moving detailed information back to the people who need it. Find out more about decision support and parallel processing from the company with the world's largest installed base. And more than 400 successful applications already in place.

Call 1 800 447-1124, ext. 1006. We'll tell you more.

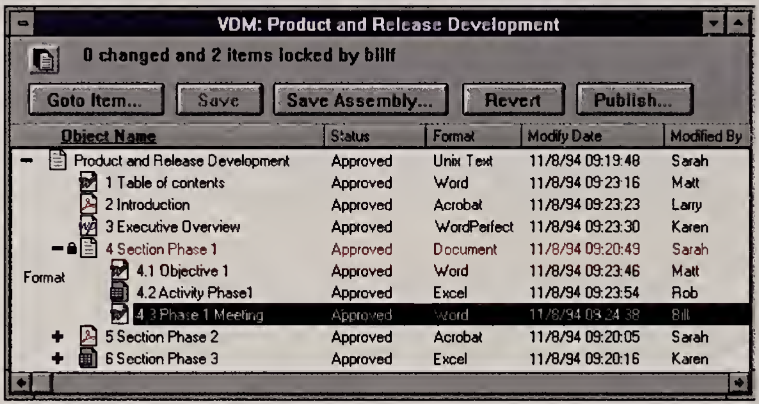
Teradata is a trademark of AT&T Global Information Solutions. All other products are trademarks or registered trademarks of their respective companies. ©1995 AT&T Global Information Solutions.

Turning information into understanding.

GET move USE IT.™

Now that NCR and AT&T are one, computing and communications have come together to help you get, move, and use information.

AT&T
Global Information
Solutions



VDM: Product and Release Development

0 changed and 2 items locked by billf

Object Name	Status	Format	Modify Date	Modified By
Product and Release Development	Approved	Unix Text	11/8/94 09:19:48	Sarah
1 Table of contents	Approved	Word	11/8/94 09:23:16	Matt
2 Introduction	Approved	Acrobat	11/8/94 09:23:23	Larry
3 Executive Overview	Approved	WordPerfect	11/8/94 09:23:30	Karen
4 Section Phase 1	Approved	Document	11/8/94 09:20:49	Sarah
4.1 Objective 1	Approved	Word	11/8/94 09:23:46	Matt
4.2 Activity Phase1	Approved	Excel	11/8/94 09:23:54	Rob
4.3 Phase 1 Meeting	Approved	Word	11/8/94 09:24:38	Bill
5 Section Phase 2	Approved	Acrobat	11/8/94 09:20:05	Sarah
6 Section Phase 3	Approved	Excel	11/8/94 09:20:16	Karen

VIRTUAL DOCUMENT MANAGER *from Documentum Inc. lets users create and manage customized documents.*

COMPUTER SCREEN COURTESY DOCUMENTUM INC.

one user to another] as long as they don't contradict," says Carl Frappaolo, executive vice president of Delphi Consulting Group Inc. in Boston. Object assembly can even be automated by pre-established business rules.

And because the document objects are managed by EDM software, there is no chance of working with outdated versions. "You can reconstruct documents on the fly with high integrity because the objects are contained in a library that's maintained with integrity," says Thomas M. Koulopoulos, president of Delphi Consulting.

This integrity distinguishes virtual documents from compound documents. Compound documents are made up of related information created by diverse sources—text, images, spreadsheets, graphics and full-motion video. Like virtual-document objects, these components can be cobbled together in a patchwork "master document." But while compound documents are typically managed as a single entity, virtual documents are managed at the object level, which ensures each individual object's version integrity, security, tracking, auditing or routing.

Virtual documents are one of the hottest items on EDM vendors' plates today. "The document object is a core component of our technology," says Mark Perry, CEO and president of Alameda, Calif.-based Viewstar Corp. "It's a competitive advantage now."

Viewstar and its brethren are no doubt attracted to the market because of its growth rate, up 106 percent since 1992 and expected to jump another 50 percent this year to $269.2 million, according to Delphi. And that's only for technology focused strictly on document library management services. Add related products like text retrieval, workflow and imaging to the equation, and the market approaches $4 billion.

> "I don't think the industry is to the point where we can say virtual documents are a push-button operation. There's still lots of assembly that systems don't do yet."
>
> – *Gregory Jenko*

"The leading vendors are all working to make the virtual document possible, and it's essential that they do," says Linda Myers-Tierney, executive consultant in International Data Corp.'s Document Management Research Group in Framingham, Mass. (IDC and *CIO* are owned by the same parent company.) The concept's reusability feature is driving the growth, she says.

Reuse is a key capability for pharmaceuticals firm Glaxo Inc., which must submit applications for approval of new drugs to regulatory agencies around the world, each of which requires the information in a different format. By dividing otherwise huge documents into multiple objects, it's easier to assemble variations of the information to comply with different agencies' specifications, explains Dr. Joel Dobbs, director of information services at the Research Triangle Park, N.C., firm. Since components of a drug application are created and reviewed by dispersed teams over a period of years, it is more practical logistically to manage the pieces individually as objects, he adds. "It makes geography less relevant and allows information to be shared in a more timely fashion." The drug giant began limited implementation of a 10,000-user-licensed EDM system from Pleasanton, Calif.-based Documentum Inc. last August.

Reuse and up-to-the-minute version control are the main attractions for the Chevron USA Products Co.'s Pascagoula Refinery in Mississippi. In response to government safety regulations imposed two years ago, the refinery must guarantee that its operators have access to the latest safety and emergency procedures, most of which are contained in documents. For part of the solution, Chevron turned to EDM tools from Interleaf Inc. of Waltham, Mass., which ensure updated, online access over the network.

For example, for every piece of equipment in the refinery, there are associated documents—maintenance instructions, operational instructions and material safety data sheets—which may be archival images, text or even computer-aided design drawings. Much of this information is the same for multiple pieces of equipment, allowing Chevron to leverage the reusability of objects. "There's a lot of information used over in many situations, a lot of similar procedures. [With reusable objects,] you just have to encode the unique parts of a procedure," says Lyle Ask, supervisor of IS at the Pascagoula Refinery.

At The World Bank, headquartered in Washington, EDM applications store and retrieve each document in two forms: an image of the master version and a version that has been dissected into objects. The image of the master document remains in the system as a historical record of the loan. But objects such as graphs, charts and boxes are all indexed and cataloged individually. This redundant approach could alleviate concerns of users (such as the Montgomery project manager) over the lack of a complete master copy of a document. It also accommodates regulations that require preservation of documents in their complete form.

As with the multinational Glaxo, EDM has diminished the business impacts of oceans and time zones for The World Bank. With facilities around the globe, the bank has been using filing and retrieval software from Excalibur Technologies Corp. of San Diego and is now evaluating document workflow systems from Xerox Corp.'s XSoft division (InConcert) and Digital Equipment Corp. (Linkworks Developer's Tools), one of which will eventually be used to automatically route virtual-document objects. "We might have a task manager working on a project in Indonesia who needs to draw on the expertise of people in our other regions. Workflow allows you to automate that spectrum of activity and keeps the paper to a minimum," says Hywel Davies, senior advisor in Organization and Business Practices for The World Bank.

> If users must skip out of the EDM system to fire up a nonintegrated application, they may decide to keep their own files on a hard disk or in a file cabinet, undermining most of EDM's advantages.

Kansas City-based engineering firm Black & Veatch will also be applying workflow to its virtual-document objects. Documentum's workflow module will route project specification objects—mechanical and electrical specs, for example—to appropriate teams across the firm's international offices as needed. In addition, the objects will be indexed and stored individually to control version integrity and access rights.

Though the concept behind the virtual document is simple enough, implementation remains a challenge. For starters, figuring out how to apportion a document into object components is not necessarily intuitive. Breaking documents into too many objects can create an exponential set of mini-documents that could tax both the EDM system and users' patience.

Even without going overboard, the upfront labor can be significant. "There is extra overhead in deciding which pieces should be objects," says Clark Hodge, MIS manager at S.M. Stoller Corp., a Boulder, Colo., waste-management contractor whose primary client is the Department of Defense. "I'm not sure there'd be a lot of payoff in that function for us." Hodge figures it will be relatively simple for users to manually extract parts of documents they wish to reuse, so he has opted to store and manage the master documents intact with his soon-to-be implemented EDM system, most likely from Tallahassee, Fla.-based PC Docs Inc.

There's also labor involved in building links, which tie documents (or their objects) to each other and to other applications or files. Utilizing live links, or OLE hyperlinks, objects can automatically retrieve, display or launch whatever they are linked with. This saves the user the trouble of calling up every component separately and launching each original application tool to edit the documents.

Unfortunately, there's no way to avoid the hassle of setting up these linked relationships. "I don't think the industry is to the point where we can say virtual documents are a push-button operation," says Gregory Jenko, senior manager for document management at Andersen Consulting in Chicago. "There's still lots of assembly that the systems don't do yet."

This is a minor pain in comparison with the biggest barrier to document virtuality: interoperability across a networked enterprise. It can be difficult to coax document objects created by different authoring tools to interoperate. It's even more problematic to cross operating environments and network platforms—bridging, say, Unix and Windows NT.

"Interchanging document objects across applications is where the virtual concept does not transcend into reality," says Delphi's Koulopoulos. The problem affects every type of document management, not just the virtual variety. If users must skip out of the EDM system to fire up a nonintegrated application, such as a computer-aided design program under a separate operating system, they may decide to keep their own files on a hard disk or in a file cabinet, undermining most of EDM's advantages.

Interoperability at the network level is essential for users like Eastman Kodak, where one department—customer equipment service—alone produces 700 million documents a year. Conforming tools and platforms would be difficult because of the sheer size of the organization. Instead, Kodak's IS group is striving for interoperability at the information level, so documents can be placed into repositories in a standard, retrievable format that allows access across platforms, says Karl Fonda, leader of Kodak's Data Management Center of Excellence in Rochester, N.Y. Standard generalized markup language (SGML) is the cornerstone that ensures this interoperability, Fonda says, and he is testing and recommending EDM products that conform to this 9-year-old, ISO-certified standard.

Most companies that have already implemented virtual-document management have avoided the interoperability problem rather than solved it. Some have entrusted their entire EDM needs to a single vendor to avoid integration problems. Others have stuck with a single document type, such as word-processor text. And some, including Glaxo, are lucky enough to have common creation and editing tools and network protocols. A few have pounded out custom application programming interfaces (APIs) for integration; Black & Veatch chose

Documentum's product based on its API openness.

For those who prefer out-of-the-box interoperability, there are as many as six standards coalitions—led or backed by the industry's biggest vendors—working to make that a reality at the server and desktop level (see related story, this page). Since many of the standards efforts remain works in progress, users hungry for EDM will have to forge ahead and take their chances. "By the time you're ready to do something, the standards are just being developed. We couldn't afford to wait," says Darci O'Brien, information management section lead at Black & Veatch.

When considering EDM suppliers, the best bet is to make sure the prospects show commitment to at least one standards effort. "As CIOs are selecting vendors, a bell should ring if the vendor hasn't dealt with any of these standards organizations," says David Yockelson, program director at consulting firm META Group Inc. in Stamford, Conn. "You don't want a company that's proprietary in the way it stores files or documents."

> Since many of the standards efforts remain works in progress, users hungry for EDM will have to forge ahead and take their chances.

If deciding among vendors, features and standards sounds like another nightmare, CIOs should wake up to the fact that documents contain most of the enterprise's informational crown jewels. It only makes sense to expend some sweat fashioning a worthy management system for these virtual containers.

Stand by Your Standards

They may be immature, but you can't live without them

Without standards, virtual and compound documents will probably create more trouble than they're worth. To really reap the benefits of reusability and transparent user access from multiple locations, the documents and their object components must span operating platforms, creation tools, repositories, network protocols and even multiple electronic document management (EDM) systems. Most CIOs with heterogeneous environments are rightly hesitant to accept the necessary integration challenge. For help, some are looking to (and even joining) EDM interoperability standards coalitions.

Their goals include:

- Creating standard APIs that allow multiple document-management applications to share objects.
- Developing APIs that integrate traditional document library management products with other applications, including workflow software.
- Allowing access and routing independent of software and hardware platforms.

Xerox Corp., which added "The Document Company" tag to its moniker last year, is a major vendor force in the interoperability and integration effort. Its printer business stands to benefit if EDM products (including its own XSoft division offerings) will interact more readily in networked environments. Last year, the company made a major push for cross-vendor integration through its New Document Alliance with more than 50 document-related companies. It also co-founded Document Enabled Networking (DEN), one of the big-three standards groups, with Novell Inc., which acquired its own EDM system through its purchase of WordPerfect Corp.'s SoftSolutions.

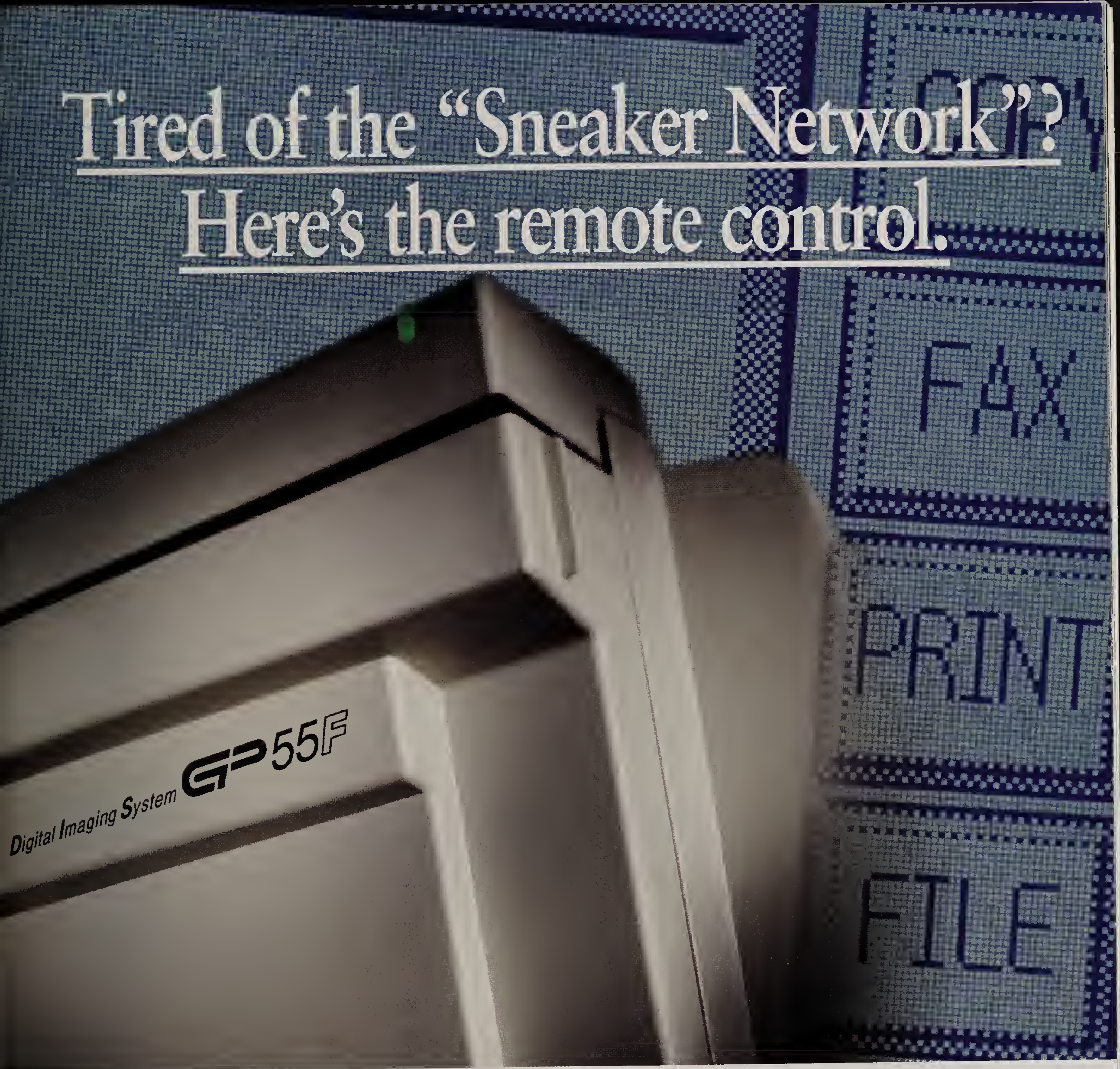
DEN's ambition is a middleware specification that will allow networked users to uniformly access electronic documents regardless of their location or format. "During the past four to five years, we conceived many of these [EDM] tools on an individual basis; now we're integrating them into a networked environment," says Peter van Cuylenburg, executive vice president of operations at Xerox in Palo Alto, Calif. Xerox's first DEN-compliant product, the 1-year-old Visual Recall, allows multilingual document indexing and searching with three-dimensional modeling capabilities.

IBM Corp., too, is in the standards forefront, co-leading the Shamrock Document Management Coalition with Saros Corp. of Bellevue, Wash. Shamrock is dedicated to enabling multiple document applications across different platforms to share objects in a common repository structure. IBM also announced its WorkGroup initiative last year, which promises to integrate its document-management products and conform them to Shamrock and other industry specifications.

The third of the big-three standards coalitions is the Open Document Management API group, which announced a spec last year that will tightly integrate desktop applications with EDM software. ODMA shares many vendor members with the other two consortia.

–R. Pastore

Tired of the "Sneaker Network"? Here's the remote control.



You've been watching the "Sneaker Network" for too long. People running from machine to machine, limiting productivity and efficiency in the office.

What you need is a more productive system. One where printing, faxing, copying and filing/scanning are all managed through a single multi-function digital system that's compatible with your current network environment. That's the kind of Total Document Management system you get with the Canon GP55 Series.

Built around open industry standards and offering direct connectivity to Ethernet and Token Ring Networks, the GP55 Series provides compatibility with most computer platforms. And because of this compatibility, you don't have to alter your computing environment to make your work environment more productive. Best of all, the GP55 Series' modular design lets you configure and expand your Total Document Management system to meet your needs now and well into the future.

The GP55 Series is just one of Canon's digital office system solutions that will raise you to new levels of productivity today and tomorrow.

When the rest say you can't, Canon says you can. For more information, call 1-800-OK-CANON.

NOW YOU CAN

Canon

Customer is responsible for determining the compatibility with their systems. Optional equipment required. Novell® and NetWare® are registered trademarks of Novell, Inc. TRIL qualified Token Ring Products are certified for physical interoperability in multivendor environments.

©1995 Canon U.S.A., Inc.

Doing Good by DOING WELL

Running IS in a nonprofit organization is not all that different from running a profit-driven shop. But sometimes it requires a special kind of resourcefulness.

BY PETER FABRIS

THE STEREOTYPICAL NONPROFIT ORGANIZATION operates on a shoestring, responds to change slowly due to the absence of competition and dwells in the technological Dark Ages. Contrary to conventional wisdom, however, many nonprofits are as vibrant as for-profit organizations and employ surprisingly sophisticated information systems. In fact, even though money is usually tight, many nonprofit organizations are coming to rely on IT as heavily as those in the corporate world do.

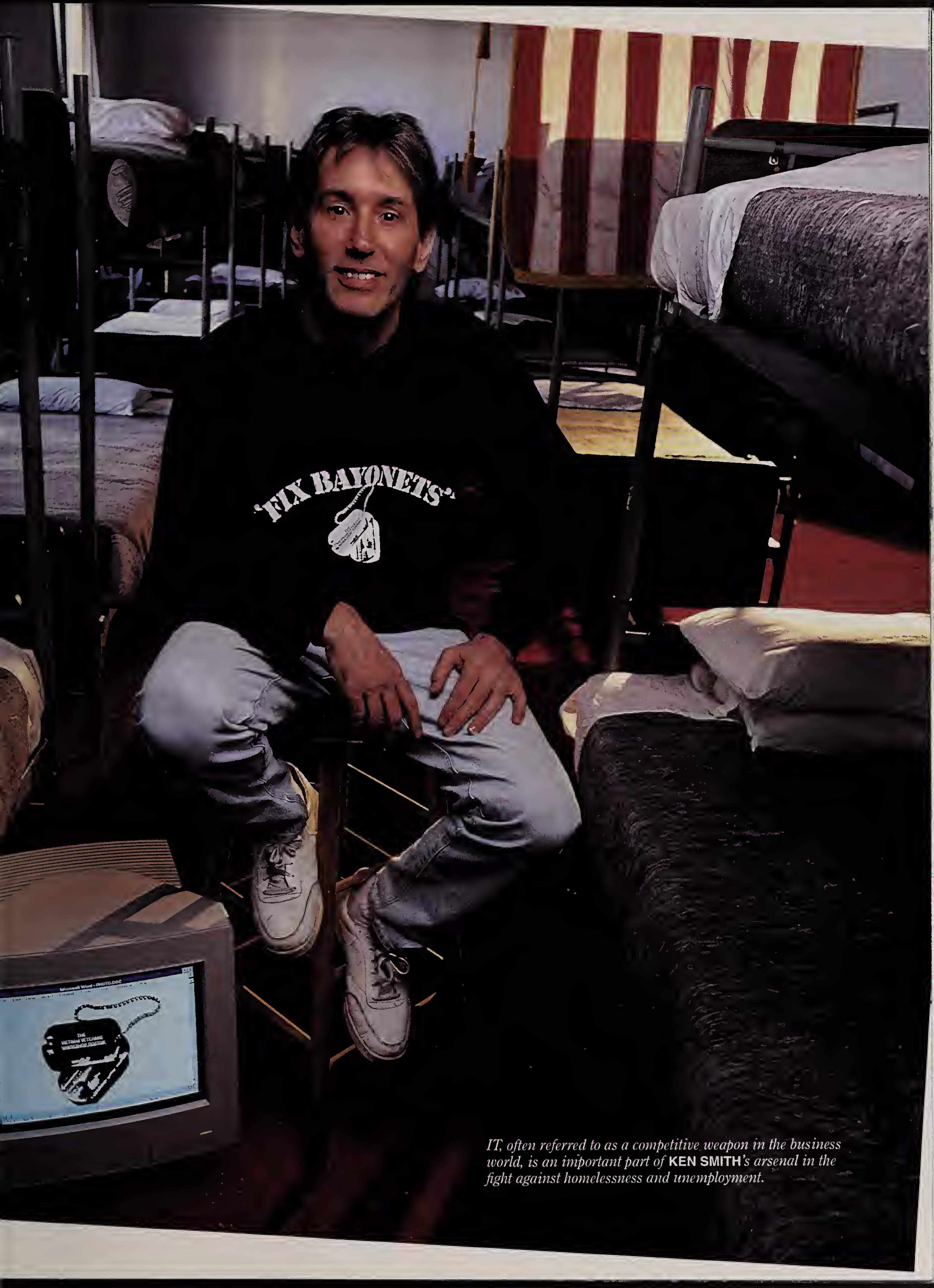
Although their missions differ—nonprofits strive to serve their constituents and fight for their causes while for-profits are devoted to investors and the bottom line—most organizational functions (including IS) are similar. The difference is in how success and payback from IT are measured.

Mission Critical

ADMINISTRATORS AT the New England Shelter for Homeless Veterans in downtown Boston have a lofty goal for return on IT investment: to obliterate homelessness and unemployment among veterans. Founded in January 1990 by the Vietnam Veterans Workshop, a support and advocacy group, the shelter has helped over 5,500 veterans in their fight to overcome substance abuse, post-traumatic stress disorder and a host of other problems with the goal of returning them to self-sufficiency. The shelter renders a range of services—providing food, clothing, training and counseling—to over 500 clients each day and houses up to 250 veterans a night. A sophisticated voice-mail system, a bar-code tracking system and PC training labs figure prominently in those efforts.

IT is an important tool not only for the staff but also for veterans from the moment they register and receive bar-coded photo identification cards until they leave as self-supporting members of society. The bar-code system, tied into a database called Bivouac, is scheduled to go online by June. It will give staff members detailed information on each veteran's history at the shelter—the services he has used or programs he is scheduled to attend—enabling the staff to serve clients better. For example, most residents are required to do at least 16 hours of volunteer work at the shelter each month. Bivouac will help staff sched-

PHOTO BY WEBB CHAPPELL



IT, often referred to as a competitive weapon in the business world, is an important part of **KEN SMITH***'s arsenal in the fight against homelessness and unemployment.*

ule work hours and make sure each veteran is pulling his weight. It will also track success and recidivism rates at the shelter. The system will consist of a fiber-optic backbone, a Banyan VINES LAN, a Windows front end developed in Powersoft's PowerBuilder with either a WatCom International or Sybase back end. Much of the technology and services involved are donated.

Many homeless veterans migrate frequently and are on the street for long periods. They receive sporadic medical and psychological treatment in whatever city they happen to be at the time. The lack of accessible, centralized medical records makes treatment more difficult. Long-range plans at the New England Shelter call for installation of Bivouac at similar facilities in other cities and for a network to link the sites to one another. The bar-code system will enable staff to track veterans as they move from city to city and to see what types of treatments and programs they've received in the past. This will help them determine how best to proceed with services. According to Grants Administrator Jim Yates, developers will build in safeguards so that only medical and administrative personnel with a direct need for this type of information will be able to access the database.

THE BAR-CODE SYSTEM will enable staff to track veterans as they move from city to city and to see what types of treatments and programs they've received in the past. This will help them determine how best to proceed with services.

Maintaining a history on residents is important because the shelter's mission is to provide more than just a warm bed and a hot meal; it is charged with assisting veterans to become self-supporting again. "We're not a warehouse; our job is to rehabilitate," says shelter spokeswoman Lori Rubin. Using bar codes—a technology used for supermarket checkouts and inventory control—to help run a social-service organization may seem impersonal, but men who served in the military are accustomed to impersonal bureaucracies, according to Rubin. "They're used to the structure and paperwork," she says.

The bar-code system will also help staff determine how many clients are using each service. With that knowledge, administrators can derive a cost breakdown of individual services, essential information for any nonprofit organization applying for government grants. Uncle Sam and state governments want a detailed account of the costs to ensure that administrative expenses are kept low and that most of the money is spent on actually serving clients. Tracking clients' participation in specific programs is now done manually, making the accounting process cumbersome. For instance, the shelter tracks the number of residents being served meals by issuing them meal tickets and then counting the tickets. Once the bar-code system is in place, a simple sweep of an ID card will automate this function.

Executive Director Ken Smith and Yates have lined up an impressive list of technology donors including AT&T, Bay Networks, Banyan, Racal Datacom and network services provider New England Systems Technology to install sophisticated voice and data networks. A 400-address voice-mail system for both staff and residents is scheduled to go online this year. For the homeless, having a voice mailbox adds a sense of independence and provides an advantage when searching for a job; companies calling to set up interviews needn't know the candidate is homeless. "It gives [residents] the ability to control their lives a little more," says Yates.

IT also plays a key role in job training. With a $718,000 U.S. Department of Labor grant (see "Trendlines," *CIO*, August 1993), the Vietnam Veterans Workshop established VetTech, a program that trains both resident and nonresident veterans in security, culinary arts, automated accounting, computer support and bus driving. The shelter has two computer labs, including a classroom equipped with 24 Leading Edge 486 PCs. Training programs emphasize hands-on participation and include basic PC skills, touch-typing drills and instruction in popular word-processing, spreadsheet and database software. Instructors aim to give veterans the basic expertise they need to land a job immediately after finishing training. Most graduates of the program get entry-level jobs, with the hope of working their way up the ladder. Job-hunting skills, including how to write a resume and cover letter, are integrated into all training courses from day one. "Getting a job is not just a suggestion; it's almost like a drill," says instructor Bill Shillue. (The program is relatively new, so there are no meaningful statistics yet on employment rates.)

Another computer lab is dedicated to PC repair and trouble-shooting. Veterans in this program repair and refurbish donated PCs, and a few of the most skilled participants provide computer support for the shelter under the direction of Bill Sullivan, course instructor and technology trouble-shooter. During the computer-repair course, veterans take apart PCs, diagnose their ills and repair them with parts from other machines. A few rehabbed computers have been deployed within the shelter for staff or residents to use. Some veterans taking this course are dispatched to handle PC service calls within the building.

It is no mean feat for any nonprofit organization to marshal the resources and expertise to put together such cutting-edge technology systems. But administrators at the New England Shelter believe that, deployed effectively, technology will be a key weapon in their battle to eliminate homelessness among veterans.

Nature's Way

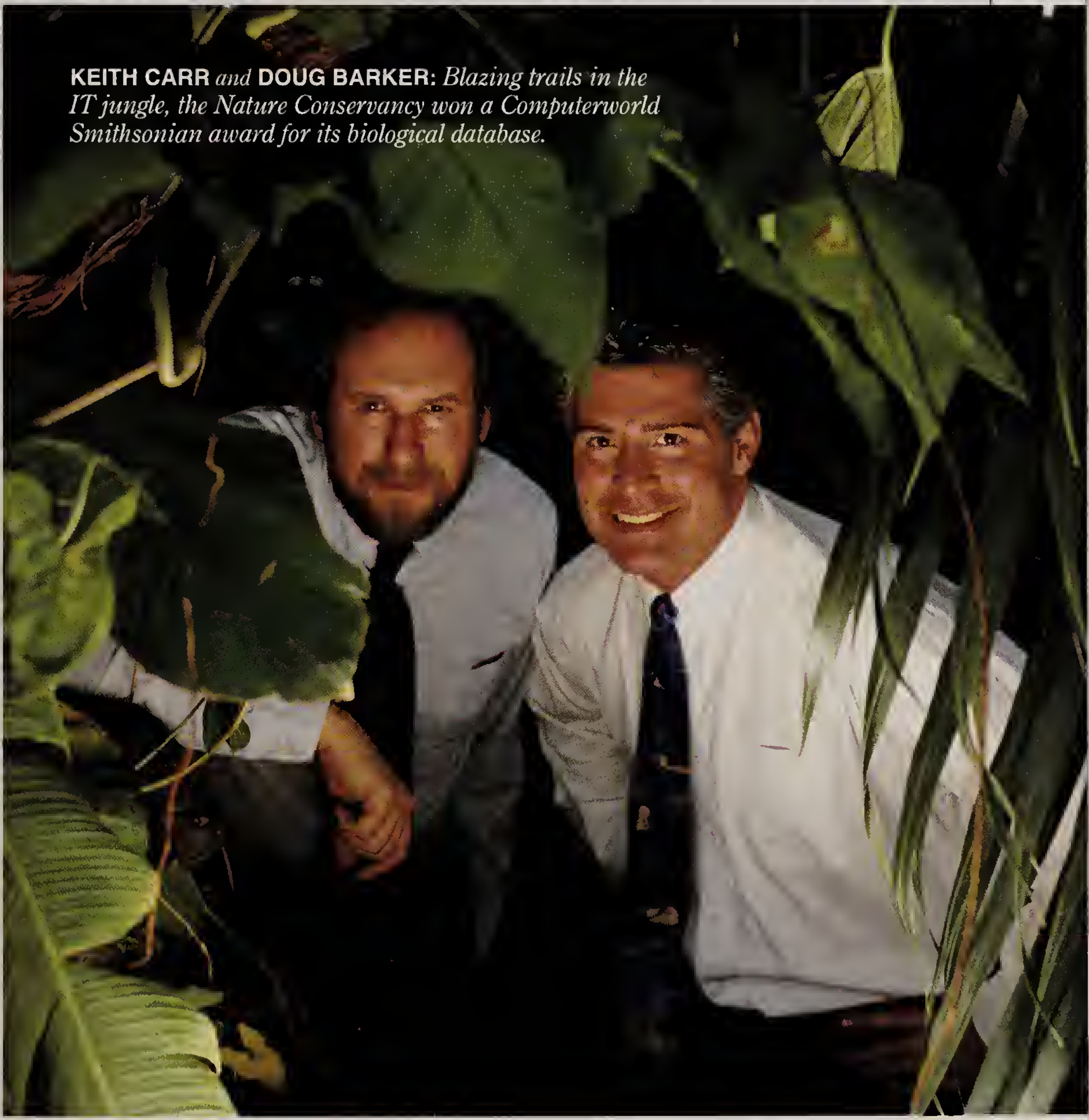
THE NATURE CONSERVANCY, an environmental group dedicated to preserving rare ecosystems, may be more technologically advanced than the typical for-profit company. The organization won a Computerworld Smithsonian Institute award last year for its biological database, used at more than 200 sites worldwide. In addition, the Conservancy has a forum on America Online and plans to put a home page on the World Wide Web. Doug Barker, director of information systems, talks of moving the Conservancy toward a paperless office as his staff ramps up a new document-storage system to enable electronic retrieval of communications and marketing material such as press releases, publications and speeches by Conservancy executives. These are not the projects of an impoverished, backward IS department.

The Conservancy's biodiversity database is at the heart of this science-driven organization's mission. "For 20 years, we've recognized that good conservation depends upon good information," says Keith Carr, director of conservation systems. IT has been an integral component of its work for two decades. In recent years, the Conservancy spearheaded the development of the Natural Heritage Data Center Network, a massive resource that contains information on rare and endangered species and their habitats.

Currently, some 200 sites representing the 50 states, five Canadian provinces, 13 Latin American countries and a variety of cooperating government agencies contribute data to the network. Each site collects data from its region, loads the information on its database and sends periodic updates—primarily via diskettes or modem—to the Conservancy's central database in Arlington, Va. "We're beginning to take advantage of electronic data exchange, including the Internet," Carr says. In the future, the network will likely have complete interconnectivity.

At Conservancy headquarters, a Banyan VINES local area network running an embedded relational-database system from Revelation Technologies Inc. stores summary data and acts as a central node in the network. The databases at local data centers include some GIS (geographical information system)-compatible files, which show the locations of endangered species and their habitats on maps; this technology will become more prevalent in future systems upgrades.

The network was funded by both government and private grants; the Conservancy's role is to provide technology and support. While the Conservancy and other environmental groups use the network, state and federal governments use it more frequently, accounting for about 70 percent of total use compared with 14 percent for the environmental groups. The private sector, including commercial developers and utilities (particularly when siting new power lines) are also among the regular users. When planning new construc-



KEITH CARR *and* **DOUG BARKER:** *Blazing trails in the IT jungle, the Nature Conservancy won a Computerworld Smithsonian award for its biological database.*

PHOTO BY KATHERINE LAMBERT

Which route would you take

Other parallel database software

New DB2 Parallel Edition for

Outside North America, contact your local IBM office. *Information derived from trade articles and press releases. IBM, AIX and DB2 are registered trademarks and Information Warehouse is a trademark of International Business Machines Corporation

to get information?

If you want to get in the fast lane, your choice is clear: parallel processing with new DB2® Parallel Edition for AIX® Parallel processing allows you to execute complex queries against huge databases in minutes, not hours or days. So analysis and reporting becomes a snap.

And as the chart below* shows, unlike its leading competitor, Oracle7, new DB2 Parallel Edition has *all vital functions* performed in parallel – which gives it a huge advantage in speed and scalability.

Parallel Function	*Oracle Parallel Query Option Version 7.1.3*	*IBM DB2 Parallel Edition Version 1.0*
Optimized for Parallel	No	Yes
Consistent Architecture with SP2	No	Yes
Index Scan	No	Yes
Inserts	No	Yes
Selects	Yes	Yes
Updates	No	Yes
Deletes	No	Yes

That means you'll actually be able to *use* all of your stored corporate data, for unparalleled insight into your customer and a big advantage over your competition.

So get the IBM benchmark data and white papers. And find out how to get ahead fast with new DB2 Parallel Edition – an IBM Information Warehouse™ solution.

Call 1 800 IBM-3333, STAR GA007

IBM® DB2 Parallel Edition for AIX:

Software for Data Warehousing.

Industry-unique **scalability.**

All **queries** executed in parallel.

Support for parallel **insert/update/delete.**

Optimizer built for parallel execution.

OLTP/parallel query in one engine.

IBM®

a registered trademark of Oracle Corporation. © 1995 IBM Corp. All rights reserved.

tion, developers "need to know what endangered species are in their way," as part of environmental-impact studies, Carr says.

With this system, biologists can conduct research that was difficult or impossible before. They can find out the status of rare and endangered species over an entire habitat range by searching a single database. (Previously, that research would have taken months or years.) In some cases, scientists have discovered that certain species are not as threatened as was thought, Carr says. Other species, such as many freshwater mollusks, are faring much worse than had been believed. Conservancy real-estate specialists use the system to locate for purchase ecologically valuable land parcels—areas having an unusually high number of rare species, such as streams with high concentrations of rare mollusks, for example.

THE ORGANIZATION'S FUTURE World Wide Web strategy includes establishing hyperlinks from a Conservancy home page to the Heritage Network and other scientific and environmental networks.

The organization's future World Wide Web strategy includes establishing hyperlinks from a Conservancy home page to the Heritage Network and other scientific and environmental networks. These interactive services should aid scientists both within and outside the Conservancy by making it easier for them to access this data and share information. "It will be an invaluable way to get information out to a large number of people," Barker says.

As it stands now, the Conservancy won't send any sensitive information, such as planned new land purchases, over the Internet. But, "if security continues to be improved upon, you're looking at it as a cost-effective way to provide internal infrastructure," Barker says. That's an attractive option for any organization, particularly so for the Conservancy, which has over 260 offices scattered around the world. Only a dozen of those regularly share data electronically through a WAN today.

Because the Conservancy depends largely on the contributions of its members for funding, an upgrade of its document-management system is expected to have a positive impact on the bottom line. Scores of paper documents will be scanned in using search and retrieval technology and optical character-recognition software. With the ability to access a wide range of communications, public relations and membership staff will be able to respond more immediately to members' questions about the organization's work. Volunteers have been lined up to scan in the documents. The Conservancy currently uses scanning technology for accounts-payable documents and will soon expand its use to payroll functions, including time sheets.

Although profit isn't a driving force, the organization, like any nonprofit group, does have a major incentive to keep administrative costs low: The more it saves on support services, the more it can spend on habitat preservation. "We conduct ourselves in a very businesslike manner," Barker says. "Overhead is kept tremendously low: Approximately 85 cents of every dollar goes toward land management; only 15 cents to administration and membership expenses. Any money not spent on conservation is highly scrutinized." Nevertheless, the value of IT is recognized throughout the organization, he says.

"I continue to be impressed by the way we do more with less," says Barker, who was with Andersen Consulting and Arthur Andersen & Co. for eight years before joining the Conservancy. Although the organization pays less (though not a lot less) than for-profit businesses, turnover in IS is very low, he says. "Doing such meaningful work adds tremendously to people's job satisfaction" and more than offsets salary discrepancies. Conservancy staff members are strongly committed to the organization's mission. It's a dedication that is uncommon in the corporate world and would provoke envy in many CIOs.

Marching Orders

THE SALVATION ARMY, likewise, benefits from committed IS staff, many of whom have been involved with the organization since childhood. The organization was founded in England in 1865 by a Methodist minister who used the hierarchical structure of the British Army of the era as an organizational model. In the United States, it is divided into four separate territories that operate independently, with some guidance from national headquarters in Alexandria, Va.

Although George Scolaro, director of computer services for the Salvation Army's Eastern territory in Nyack, N.Y., acknowledges some differences, he says that IS executives in nonprofit and for-profit organizations have much the same responsibilities and challenges. Scolaro's 13-person IS shop is implementing a large-scale accounting-system upgrade at the same time the IS budget has been trimmed due to a dip in the charity's fund-raising last year. The new software is putting a strain on his territory's IBM AS/400 system, but the recent organizationwide belt-tightening may mean his recommendation for a hardware upgrade will be delayed. His dilemma is familiar to that of corporate IS executives during recessions.

Although many nonprofits recognize the value of IT and commit sizable resources to it, squeezing value from limited bud-

Only Minolta can melt information problems with I.C.E.

I.C.E. – Integrated Computer-output Extension. Only Minolta's MI^{3}MS® 3000 Integrated Image/Information System offers this breakthrough productivity tool.

With MI^{3}MS 3000 *I.C.E.* you can automatically index and store electronic documents originating on mainframes and other systems. Make invoices, purchase orders, etc., part of your imaging database with no need to scan or OCR. Adding faxes, text files, scanned documents and virtually any OLE object, including spreadsheets or voice recordings, is then as simple as "drag and drop" into a folder or document *I.C.E.* has created.

Only MI^{3}MS 3000 and *I.C.E.* can do all this within our imaging system, creating a single "compound document" that seamlessly retrieves all of the relevant information needed. Then fax, e-mail, annotate or print documents with laser clarity – all on one economical, customizable and scalable system.

See why *I.C.E.* is another way to melt your information problems.
Call 1-800-9-MINOLTA

MI^{3}MS 3000 *I.C.E.*
The Image of Information Management

Copiers
Cameras
Faxes
Digital Systems
Document Imaging
Camcorders
Binoculars

Only from the mind of Minolta

MINOLTA

Come see us at
AIIM booth #1302

MI^{3}MS IS A REGISTERED TRADEMARK
OF MINOLTA COMPANY LIMITED.
©1994 MINOLTA CORPORATION

GEORGE SCOLARO: *"You have to be very frugal about everything."*

gets is a constant concern for nonprofit IS executives. "You have to be very frugal about everything," Scolaro says. In an effort to reduce costs, he recently negotiated a five-year extension with AT&T for leased lines used to link administrative systems in Nyack with divisional offices in the Eastern territory. He received a reduced rate for agreeing to the extension. The Salvation Army recently outsourced its payroll function as another cost-cutting strategy.

Scolaro's staff is responsible for three main functions running on the AS/400 platform: the accounting system; statistical information, including data on the number of members and people receiving services; and trade applications, which keep track of uniform inventories and the organization's church supply business. Scolaro's information systems group is one of four within the United States, each with equal responsibilities within their territories. Since each territory acts independently, there isn't a pressing need for interterritorial connectivity, though some e-mail communication does take place via Ecunet, a network for churches.

It's likely the organization will broaden its online activity to the Internet in the future. "I imagine within three to four years we're going to consider putting a Salvation Army node on the Internet," says Alex Gibson, computer consultant at the organization's national headquarters. The most obvious advantage to having an Internet presence would be the ability to establish an online personnel database, Gibson says. National headquarters gets frequent requests from personnel at other Salvation Army locations for referrals to people at territorial, regional and state headquarters, but there isn't currently an easy, reliable way to find out who is working where. Another obvious use for the Internet: dispersing news, policy changes and organizational goals throughout the organization.

Although he's concerned about future projects such as obtaining Internet access, Gibson spends much of his time training and assisting workers on word-processing and spreadsheet programs. Gibson, who has worked for jewelry maker Tiffany Co. and telephone manufacturer Diamond Communications, sees few differences between his role with the Salvation Army and his former roles in the corporate world. An exception: Some workers are not as PC-literate as their counterparts in the for-profit sector and need some extra hand holding.

Why did he want to work for the Salvation Army? "I've always liked the work they do and how promptly they respond to disasters like the floods in the Midwest," Gibson says.

David Skowronek, computer specialist for the Southern New England division in Hartford, Conn., echoes Gibson. Formerly a project manager at insurance giant Aetna for six years, Skowronek joined the Army last year. He's been impressed with the level of service the organization offers even on tight budgets and sees its benefits firsthand at the local level. "It was an eye-opener to come to the Salvation Army and see what the donations are used for," he says. Seeing how the organization's efforts benefit people at the local level, such as at a Hartford children's shelter, boosts morale, he says. And for many IS workers in the nonprofit world, doing good with less adds a kind of job satisfaction that can't be bought. CIO

PHOTO BY KENT HANSON

After All,
Enterprise-Wide CTI Isn't For Everyone.

If some people in your organization never see, hear from, or speak to customers, investing in enterprise-wide CTI may not be the answer. At Mitel, we offer an alternative: advanced CTI solutions that help break down the barriers to communications, one LAN at a time.

Call us and we'll send you a free CTI Primer and our cti@work™ White Paper series. Discover where CTI solutions could have the most positive impact on your business.

1 800 331-9740

MITEL

Simply Communicating

M MITEL (design) is a registered trademark of MITEL Corporation. cti@work is a trademark of MITEL Corporation. (613) 592-2122

“In skating over thin ice, our safety

is in our speed."

– Ralph Waldo Emerson

In today's whirlwind business world, thinking smart isn't enough. You have to think, and act, fast. Solve the problem on hand quickly, and you can safely move on to the next order of business. Let the problem linger, and the ice could melt.

As one of the world's largest management consulting firms, we draw from a broad range of world-class skills, ideas and practices.

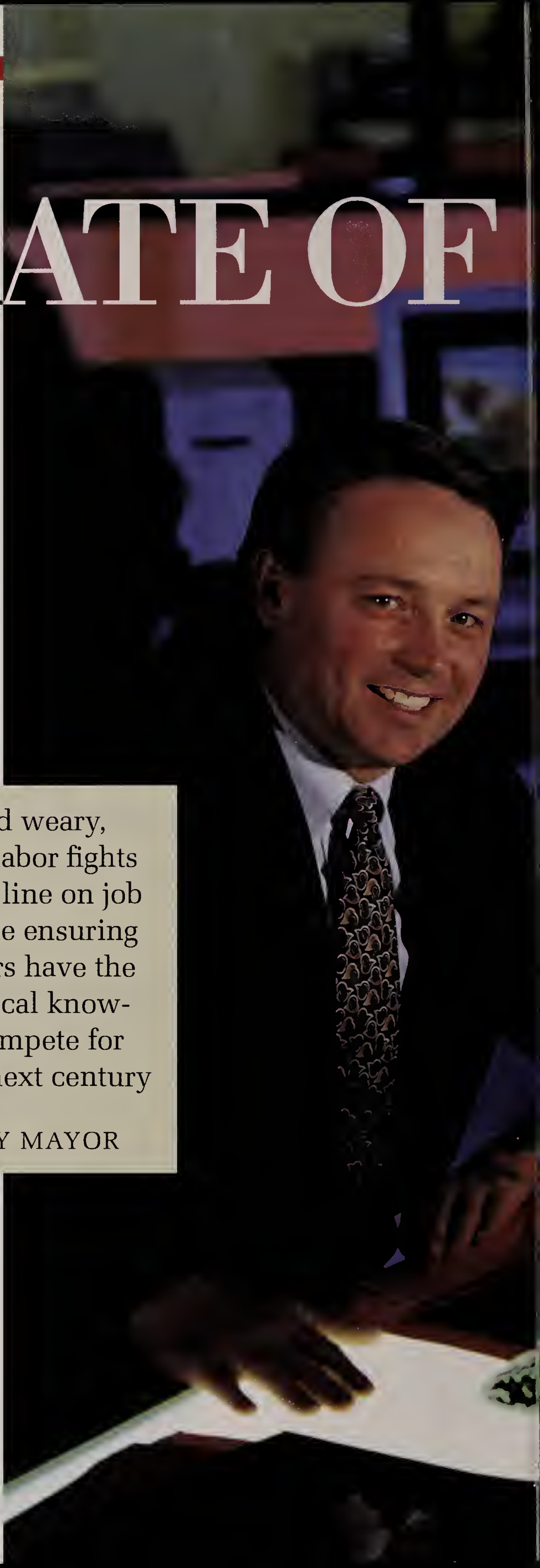
Our goal is to help you to act fast and be more competitive.

For example, we helped Alliance Blue Cross Blue Shield identify over 100 short-term improvements, and implemented some in less than 6 months. We also helped automate their medical claims processing group, eliminating $3 million in administrative costs.

If you're looking for a consulting firm that gives you the added value of fast response, take action and call Terry Ozan at (212)773-5610.

ERNST & YOUNG LLP

THE STATE OF



Wary and weary, organized labor fights to hold the line on job losses while ensuring its members have the technological know-how to compete for jobs in the next century

BY TRACY MAYOR

WHEN LABOR AND MANAGEMENT SIT DOWN to talk, agreement isn't always the first item on the agenda. But in industry after industry across the country, at least one tenet is now taken at face value: Unions aren't fighting technology anymore. In many cases, they're fighting for technology; fighting, that is, for their right to participate in the innovations that are transforming much of American business.

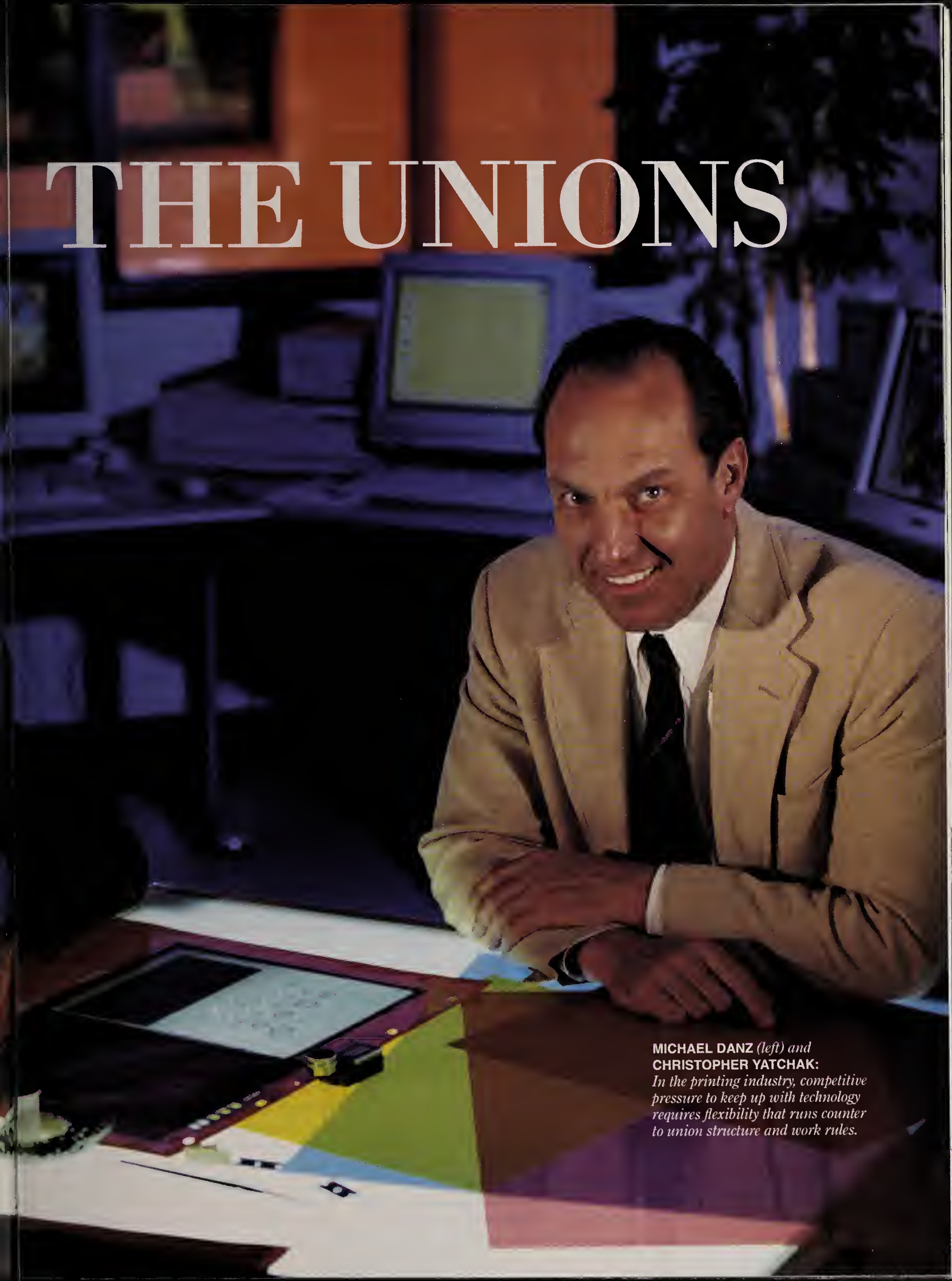
This change in attitude doesn't exactly mean the lion has lain down with the lamb, however. Under pressure from competition both at home and abroad, corporations struggle to stay productive by seeking the most flexible, dynamic structure possible, often with the help of technology. At the same time, labor is forced to wage a battle on multiple fronts to retain current jobs, require that new technology positions are designated as union jobs, and establish a workable fallback system of meaningful training and retraining for its workforce. The result of these sometimes conflicting goals is an array of union/technology relationships that are as varied as the industries they encompass.

"We're in a really interesting period in labor relations. The spectrum of relationships runs from very adversarial to very cooperative," says James Dworkin, associate dean of Purdue University's Krannert Graduate School of Management in West Lafayette, Ind. "Labor historically has been a little bit afraid of technology,...[but] unions have learned they can work with new technology, that it also creates the need for new jobs."

But the same innovations that give jobs can take away positions as well, Dworkin says. "New technology usually does reduce the head count," he says. Neither national labor groups nor industry associations make public the exact number of positions replaced by technology, but both sides agree that job loss, or what one manager calls "a surplus employee situation," often occurs when innovation is introduced.

PHOTO BY DAVE SCHLABOWSKE

THE UNIONS



MICHAEL DANZ *(left) and*
CHRISTOPHER YATCHAK:
In the printing industry, competitive pressure to keep up with technology requires flexibility that runs counter to union structure and work rules.

ROBIN MACGILLIVRAY: *PacBell downsized non-salaried staff 25 percent despite a no-layoff clause.*

PHOTO BY EDWARD CALDWELL

Anytime technology eliminates jobs entirely, the uneasy partnership between management and labor threatens to come unglued. To hold such alliances together, collective bargaining agreements often call for a host of alternative measures for workers affected by technological changes, including retraining and other types of educational assistance, job banks jointly funded by unions and management, early retirement, outplacement to another union shop that still requires the worker's position or, sometimes, an assisted transition to a completely different line of employment.

Many industries work under "no-layoff" clauses, contractual guarantees that ensure no employees will be laid off because of technological innovation. For example, Pacific Bell, the West Coast regional Bell operating company, has an employment-security agreement with the Communications Workers of America (CWA) that states that as long as people are performing their jobs satisfactorily, they are promised a job regardless of technological change. But such agreements don't necessarily crimp a corporation's ability to consolidate its workforce when necessary, says Robin MacGillivray, executive director of labor relations at Pacific Bell's San Ramon, Calif., headquarters. Since the agreement went into effect in 1986, PacBell has downsized 25 percent of its non-salaried workers, chiefly through severance packages, early retirement and attrition, she says.

MANAGEMENT **"Suppliers and clients are forcing technological changes on management and on the union. If we're going to meet the customers' needs in the marketplace, we're going to have to adapt."** *–Jack Hayes*

Alternative measures such as no-layoff clauses and retraining programs are meant to make change as manageable as possible for hourly workers. But nobody denies that a large part of the burden will likely continue to fall on labor's side, particularly as the pace of innovation increases and global competition heats up. Even workers who aren't in danger of getting a pink slip may face a dramatic change in job description or reassignment to a position that requires a completely new set of skills.

"We are a trade union, and it's our responsibility as labor leaders to determine what's the impact of technology on us and on our society," says Mike Lombardo, president of United Auto Workers (UAW) Local 160 in Warren, Mich. "High-tech jobs [are] good-paying jobs, but what I call menial labor, where's that going to go? Technology is moving so fast, it's an ongoing [process]. You have to keep looking at it and saying, 'What does it mean for us?' "

Managers say their power to control change is limited at best. In the printing industry, for example, desktop publishing and other digital technology has nearly eliminated the need for prepress positions such as camera operators, film assemblers and color strippers, explains Jack Hayes, president of Printing Industries of Wisconsin, a trade group in Brookfield that represents some 150 printing firms. And "these are not self-inspired [changes]," he points out. "Suppliers and clients are forcing technological changes on management and on the union. If we're going to meet the customers' needs in the marketplace, we're going to have to adapt."

One way companies adapt is by asking labor to reduce the number of separate job classifications, thereby allowing workers to perform more-varied tasks and management to implement a more fluid work structure. For the most part, unions have complied, in some cases, such as in the utilities field, reducing job classifications from hundreds to as few as three titles. Even so, the issue of which workers perform which tasks is still

NANCY BIAGINI: *The CWA fought to preserve pay grades for workers installing a broadband network.*

PHOTO BY EDWARD CALDWELL

up for negotiation in many industries. "It's not that [unions] are not interested [in technology], but there are layers of structure and work rules that can run counter to the flexibility you need," explains Michael Danz, president of Mandel Co., a Milwaukee-based printing company, which at press time was concluding contract talks with the Graphics Communications International Union (GCIU). "I may need a person to move from one computer to another, but that lack of clear dividing lines runs counter to the union's specialization."

LABOR **"In our industry today, education and reeducation are going to have to be as much a commitment in a person's working career as going to work every day and hitting the clock. It's a burden, but it's a necessity."** *–Christopher Yatchak*

When unions give up their clearly delineated job functions for the sake of flexibility, labor proponents say, they leave a door open for nonunion workers to take their jobs away. The reason? Bargaining agreements don't always specify that newly created technology positions will be designated as union jobs, which means organized labor must go in and renegotiate for positions it once thought were secure.

Chrysler Corp., General Motors Corp. and the UAW came to loggerheads over the issue in a disagreement that led to a strike in June 1994. About 3,500 skilled workers who belong to the UAW Local 160 walked off the job after both automakers made changes to their strategic technology centers that will allow them to streamline and accelerate the auto-design process. The companies now use computer-aided design software in an "art-to-part" design flow that drastically reduces the need for highly skilled, highly paid modelers who worked previously in wood, fiberglass or clay.

The dispute centered around who would perform the new, computer-based designing—UAW members retrained for the job, salaried (nonunion) employees or outside contractors. "The issue was, how are we going to participate in the new technology?" says Lombardo. "Management has control over the design rights, but these new systems infringe on manufacturing, validation and assembly"—all areas that were formally designated as union positions.

The UAW was equally alarmed by Chrysler's moves to directly involve some of its independent parts suppliers in the earliest stages of design work—a practice that is currently seen in certain manufacturing circles as smart process reengineering, but one that the UAW viewed as an insidious form of union busting because auto-parts suppliers are generally nonunion and accept lower wages.

As a result of the strike, General Motors agreed to open 136 jobs that had formerly been held by salaried or subsidiary employees to members of Local 160 and to invest $5 million in new equipment to train union employees on new technology. Chrysler reduced the number of outside contractors at its technology center from 38 to six, agreed not to hire more contractors without the UAW's consent and created a new job classification, "designer specialist," with a new pay grade.

On the West Coast, Pacific Bell and the CWA have wrestled with a similar issue. PacBell is in the midst of a multiyear, $16 billion project to install a state-of-the-art broadband network throughout California. The CWA hailed the project, and the new technology, but "we needed an agreement to address how our folks came across [to the new project], to determine how broadband jobs were to be paid," says Nancy Biagini, president of CWA Local 9423 in San Jose, Calif., and a former PacBell technician.

PacBell had made moves to establish lower pay grades for work on the broadband network, though the work functions were similar to existing jobs with higher pay grades, according to Biagini. "It's new technology, sure, but you're still planting poles, you're still pulling wire, only now you're pulling co-ax and fiber rather than twisted pair," she says. The CWA and PacBell worked out an agreement that preserved wage levels in three of four titles under dispute, Biagini says.

> **LABOR** **"The retraining program is good, but it's a little tough on some of our folks. In most cases, you're talking about moving or not having a job. That's a whole lot of frosting, but let's not forget the cake."** *–Nancy Biagini*

For its part, Pacific Bell is proud of the broadband agreement. "Some companies might have put those jobs offshore or into a [nonunion] subsidiary," points out PacBell's MacGillivray. "The CWA has been with us for the past 100 years, so we said, 'Let's see if we can make an agreement.' We didn't have to do it that way."

CWA and Pacific Bell are in the happy position of negotiating over new positions and new work. For other CWA workers, most notably its operators, and for a host of union members in a range of other industries, the news isn't as positive. Oftentimes, newly created technology jobs simply don't equal the number of jobs replaced by technology.

"When desktop technology first came into the [printing] industry, around 1990, we saw no adverse effect in employment. In the last two years, [the technology] has accelerated to a great degree," says Christopher Yatchak, president of the GCIU

The New Technology Cha-Cha

Does it take longer to introduce new technology to unionized employees than to others? The answer, according to managers in fields as diverse as public utilities, electronics, printing and communications, is no.

To the uninitiated, the process of checks and balances that follows an idea from the research lab to the shop floor may seem prohibitively complicated. But managers report that the process of informing unions of forthcoming technology and appraising its impact rarely increases rollout time because it happens alongside other corporate decisions, such as assessments of financial viability.

Working with a union may actually have an added benefit: Once a collective-bargaining agreement has been reached on how the process should work, managers don't have to start from scratch each time they want to introduce new computers, realign job responsibilities or shift workers' schedules.

Robin MacGillivray, executive director of labor relations for Pacific Bell in San Ramon, Calif., emphasizes that her company is free to make its creative technology decisions without union involvement. Only after technology has been given the official go-ahead does labor become officially involved.

MacGillivray says PacBell's technology-rollout process typically includes the following steps:

Step 1:

The germ of an idea forms in somebody's mind and is fleshed out into a proposal. Pacific Bell conducts consumer focus groups, consults with user groups and gathers other information as it deems necessary before the idea is submitted for financial and legal approval.

Step 2:

Under the terms of an agreement reached with the Communications Workers of America (CWA) in 1989, PacBell convenes a technological change committee comprising representatives from the company and the union to discuss implementation and impact of the technology. "The timing is designed so the union can contribute its thinking on training and other implementation concerns," says MacGillivray.

Step 3:

Under another agreement, Pacific Bell calls a separate session whenever change is going to affect the working conditions of a local work team, so the local union is kept abreast of specifics. "It's a question of global versus local jurisdictions," MacGillivray explains. "We're talking front-line kinds of issues," including training needs and, if necessary, job-reduction numbers.

Step 4:

If Pacific Bell anticipates that jobs will be eliminated as part of a technology change, a separate contract spells out exactly how and when rank-and-file union members are notified, giving them time to explore other options within the company. The minimum time frame for the news, says MacGillivray, is about 60 days. "But that's for the formal notification," she points out. Because of the way the process works, union members should have been aware well before that point of how the technological change was likely to affect their jobs. *–T. Mayor*

It Works.

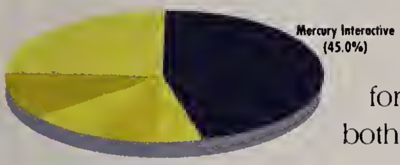
Test your Client/Server applications using Mercury Interactive.

Managing the Risk of Client/Server Deployment

Knowing how well Client/Server applications will work under real operating conditions is a dream come true for developers. Using Automated Software Quality tools from Mercury Interactive to automate your Client/Server testing effort, you can manage risk effectively—and help ensure the success of your deployment.

The Leader in Automated Software Quality

Mercury Interactive sets the pace in Automated Software Quality, pioneering the innovations that make test automation powerful, productive and practical. Mercury Interactive is the leading provider of ASQ solutions for Client/Server applications in both UNIX and Windows environments—for the department all the way up through the enterprise.



Mercury Interactive is the undisputed market leader in ASQ tools. (Source: International Data Corporation 1994)

WinRunner® and XRunner® are the tools of choice for testing graphical user interfaces. LoadRunner™ allows you to simulate up to thousands of users on just a handful of workstations. And TestDirector™ is the workgroup test management system that keeps the whole process on track.

A Tool for Every Testing Need

Mercury Interactive has the tools to address all levels of Client/Server application testing. *The Enterprise Quality Architecture*, our core integration technology, ensures that the tools work together seamlessly.

A Complete Solution

"Testing requires a complete solution—from the client, to the network, to the server and back again to the client. Mercury Interactive is on the right track with features that support complete testing." – *Shaku Atre, President, Atre & Associates, an independent consulting firm based in Port Chester, N.Y.*

It Worked for Chemical Bank

"Without Mercury Interactive's testing tools, we never could have completely tested our new trading floor before deployment" – *Rush Taggart, Vice President, Infrastructure and Integration Group, Global Bank Technology, Chemical Bank.*

Find Out How It Can Work For You. Call 1-800-TEST-911 for a free information kit, and find out how ASQ tools from Mercury Interactive can make it work.

mercury
interactive

Making Client/Server Work

© Copyright 1995 by Mercury Interactive Corporation. TestDirector, LoadRunner and *Enterprise Quality Architecture* are trademarks of Mercury Interactive Corporation. WinRunner and XRunner are registered trademarks of Mercury Interactive Corporation. All other companies and brand names are trademarks of their respective companies.

local 577M, which represents 2,000 printing and prepress employees in the Milwaukee/Madison, Wis., area. "We have lost some employment as a result of that." Although Yatchak declined to estimate the actual number of lost jobs, he concedes, "there hasn't been a one-for-one exchange of jobs."

Like nearly every other industry with unionized employees, the printing business has responded with an aggressive retraining and education program. Union and nonunion workers alike can study new technology or train for an alternate career at the Milwaukee Graphics Arts Institute, which is funded primarily by printing companies with help from grants and union contributions. Students pay tuition based on a sliding scale.

Pacific Bell has set up a $9 million fund, coadministered by the CWA, that supports a clearinghouse for employees who want to upgrade skills on their own time or learn a completely new line of work. Similarly, the United Auto Workers has a broad-ranging agreement with the Big Three automakers that subsidizes members who want to study at nearly any trade, two-year or four-year institution to upgrade their work skills.

Still, retraining isn't a universal cure. For one thing, employees must put in hours above and beyond their work time, some on a continuous basis. "In our industry today, education and reeducation are going to have to be as much a commitment in a person's working career as going to work every day and hitting the clock," says the GCIU's Yatchak. "It's a burden, but it's a necessity."

MANAGEMENT **"Generally speaking, technology has improved productivity, and productivity is necessary. Without a competitive advantage, there are no jobs."** *–Paul Allaire*

And at times, retraining can be more of a feel-good response than a real solution for displaced workers, union officials say. Biagini, whose CWA local is one of several that represent West Coast AT&T employees, says the education options offered to 500 California-based AT&T operators replaced by an automated voice system over the past two years weren't realistic for everyone involved. Workers were asked to relocate in order to retain employment as operators, she says. And those who didn't want to move faced retraining for new positions in such areas as sales and marketing—but with no guarantee of job placement. "The [retraining] program is good, but it's a little tough on some of our folks," Biagini says. "In most cases, you're talking about moving or not having a job. That's a whole lot of frosting, but let's not forget the cake."

MIKE LOMBARDO: *High-tech jobs pay well, but unions like the UAW must protect "menial" laborers.*

But management insists it has to draw the line somewhere. Employment guarantees, retraining, early retirement and other incentive packages aside, a corporation's responsibility has to be first and foremost to the bottom line, and market conditions must take precedence.

"Generally speaking, technology has improved productivity, and productivity is necessary. Without a competitive advantage, there [are] no jobs," says Xerox Corp. Chairman and CEO Paul Allaire, who is often credited for his visionary management of a turnaround of the Rochester, N.Y., firm. "When it comes to job loss, you have to look at it on a macro scale. Would that plant be there at all without the productivity [improvements]? On the macro scale, those industries that don't modernize will close down."

In Wisconsin, Mandel Co. continues the sometimes precarious balancing act of paying heed to that macro vision while still managing the welfare of its workforce. Through attrition, retraining and holding onto employees as long as possible, Mandel has managed so far to avoid drastic layoffs, says Danz. "Right now we're keeping up with the pace of technology and still remaining competitive. But if there's a downturn in the economy, all that could change."

Tracy Mayor is a freelance writer and editor based in Beverly, Mass.

PHOTO BY JON MURESAN

If You've Set Your Sights on

Client/Server

You Need Your Hands on

BackOffice

Introducing Microsoft® BackOffice.
A Family of Server Products that
Streamlines the Move to Client/
Server Computing.

For larger organizations, finding the easiest, most cost-effective route to setting up a client/server system can be a real challenge. Microsoft BackOffice provides a solid foundation for client/server applications through modular server products that run on the Microsoft Windows NT™ Server network operating system. Microsoft Systems Management Server offers centralized management for distributed systems. Microsoft SQL Server™ delivers high-volume transaction processing and database management. Microsoft Mail Server lets you communicate with anyone, anywhere. And Microsoft SNA Server provides efficient, flexible links back to data on IBM® hosts.

Together, these systems make Microsoft BackOffice the best platform for the new generation of business applications.

Mail Server $429*

Windows NT Server $639*

Systems Management Server $629*

SQL Server $929*

SNA Server $379*

Rely on the Expert
For over twelve years, Software Spectrum has specialized in meeting the software buying and technical services needs of large businesses. We have the knowledge and experience to help you make the most cost-effective choices. Call us today!

1-800-824-3323

7am to 7pm (Central)
In Canada call,
1-800-624-6224

SOFTWARE SPECTRUM

*Additional client licenses must be purchased to access each server product. All prices subject to change. Other restrictions may apply. All product names are the property of their respective owners. ©1995 Software Spectrum.

The Speed Ticket

Low prices and mainframe-like performance are helping massively parallel processing make inroads into commercial applications

BY JOHN EDWARDS

Massively parallel processing. The name certainly sounds impressive. But vendors of computer systems using massively parallel processing (MPP) technology will have to offer customers more than an imposing name if they hope to provide an attractive and practical alternative to venerable mainframe machines.

MPP technology, which ties together hundreds—or even thousands—of processors into a single computer, uses large numbers of "commodity technologies," such as chips, disk drives and interface circuits, to keep prices low and performance levels high. As a result, MPP hardware vendors rely on economies of scale to keep prices down while offering mainframe-like performance. Tests conducted by the Transaction Processing Council, a research organization in San Jose, Calif., found that the cost per transaction per second (TPS) associated with MPP systems is in the $2,500-to-$5,000 range, compared with about $40,000 per TPS on a mainframe.

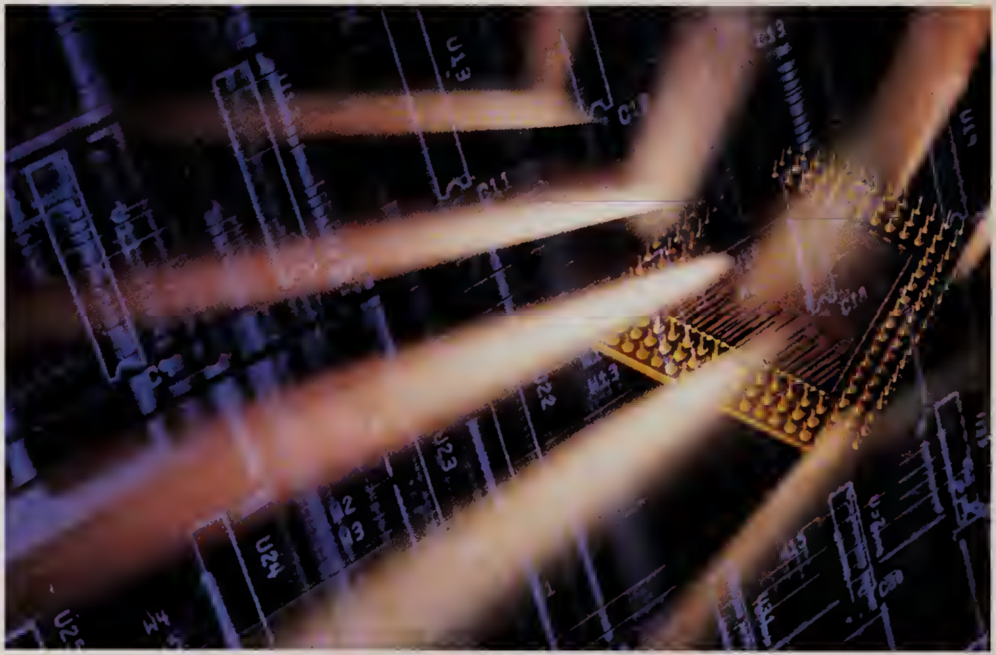


PHOTO BY RALPH MERCER

MPP systems made their initial mark in the mid-1980s in engineering and scientific applications, particularly in the academic and defense fields. R&D managers in these areas were able to tolerate the emerging technology's numerous growing pains while taking full advantage of its low cost and high processing power. But by the early and mid-1990s, the combination of deep defense cutbacks and a lingering economic recession had several MPP manufacturers up against the ropes. In the past couple of years alone, a variety of market leaders have faced the abyss: Thinking Machines Corp. declared bankruptcy, MasPar Computer Corp. shook up its executive ranks and received a $5 million cash infusion from its equity investors, and Kendall Square Research Corp. quit the MPP field altogether.

Looking for a way to revive their flagging industry, MPP vendors have begun turning their attention toward commercial customers—specifically, organizations that handle large amounts of information or high volumes of transactions. So far, the nascent market appears quite promising. A recent study conducted by Gartner Group, the Stamford, Conn.-based market-research firm, surveyed 139 companies representing the largest enterprises across 15 industry groups. Of the respondents, 27 percent have installed at least one parallel system, 27 percent are closely evaluating the technology and 45 percent are tracking developments in the field.

But while the raw numbers may look good on the surface, MPP systems makers still face a challenge in transforming a primarily research-based technology into a product that will appeal to a wide range of commercial customers. While higher-education and defense users have been

LANIER

Today's office environment. It can be filled with pitfalls and danger snapping at your heels. Lanier can get you through it safely. We're ready to assist you with all your optical disk storage and retrieval needs. From our desktop EasyFile 3140 to our larger information management systems, we've got the office solutions you're looking for. Solutions that will help you manage documents and data information easily. We're ready to deliver these exciting technologies, but only when they meet your needs and applications. That's because we look at your problems through your eyes and see them as you do. We call it Customer Vision®. It's our promise that you'll receive complete satisfaction because we have met or exceeded your expectations. When you need us just call 1-800-708-7088 or fax us at 1-800-252-9703. Lanier. Consider us your bridge over troubled water.

COPY
FAX
IMAGING
DICTATION

LANIER

WE'RE THE PART THAT'S ALWAYS WORKING.

HARRIS

Lanier Worldwide, Inc.

willing to trade off the technology's rough edges for its lower costs and higher performance, commercial customers have generally proven far less forgiving. Gary Smaby, president of Smaby Group Inc., a Minneapolis-based company that specializes in high-performance computing research, says commercial users want a technology that produces quick results, not a bigger burden on already-stretched personnel resources. "Early commercial MPP users are far more concerned with the bottom line than the technology itself," he says. "Many aren't very familiar with the underlying architecture and couldn't care less. All they know is that with these machines, they can address problems that they could not even imagine doing on a mainframe."

Smaby notes that most businesses—unlike many research-driven organizations—don't adopt a new technology simply for the technology's sake. Rather, there's a fundamental difference in the procurement approach. In commercial organizations, "there's almost always a cost/benefit analysis, sometimes a job on the line," he notes. Most organizations turn to MPP technology for help in one of two areas, he adds: accessing and managing large databases in real-time for enhanced decision support, and higher-capacity online transaction-processing applications, such as financial modeling and airline-reservations management. "But databases are definitely the big application," says Smaby, although he notes that imaging and video-on-demand applications are also beginning to find solid niches in the MPP universe.

The advantages of MPP aren't hard to understand. Mainframe-based decision-support applications typically process 3MB to 4MB of data per second. By comparison, a parallel system can support data bandwidths of 100MB or more per second within an application. The technology also provides several other key benefits, such as fast and predictable system-response times and built-in fault tolerance: If one processing node fails, the system can usually continue operating without it.

Like most other experts in the field, Smaby believes that MPP hardware has surged past software in terms of usability and availability. This wasn't a major problem when the technology was limited to R&D experts, most of whom consider the creation of custom applications routine. But mainframe users, accustomed to selecting from a wide range of prepackaged solutions, have come to expect products that they can run on their systems without the need for extensive modification. "That's not currently the case with MPP today," Smaby says.

> **"You have to figure out what you're going to be doing on the parallel machine to determine what architecture would be appropriate for the kinds of problems you'll be working on."**
>
> —*Jay Aronson*

While the MPP industry has been heartened by Oracle Corp.'s decision to port its Oracle 7 database-management system and Structured Query Language (SQL) support to several major MPP platforms, as well as by IBM's decision to offer a parallel version of its DB2 within the next year or so, "canned" applications remain scarce, particularly outside the database field. This factor has dampened the enthusiasm of many current mainframe users who would move to MPP in a heartbeat if only they could find a compatible parallel application that would run under the new technology.

Jay Aronson, an associate professor of management at the University of Georgia in Athens, says the software situation is gradually improving, but not fast enough for many commercial users. He notes that most MPP adopters continue to develop and run custom applications or proprietary products provided by the hardware vendor. "Each vendor has its own set of products it offers customers, and all the major software houses that have products running in serial are now trying to get their applications running on the more popular parallel machines."

But Geoffrey Fox, director of the Northeast Parallel Architectures Center at Syracuse University in Syracuse, N.Y., observes that porting the many millions of lines of existing code from sequential to parallel platforms may ultimately be an insurmountable problem. "Larger codes, greater complexity and longer life cycles make it much more difficult to convert industry codes than academic research codes," he observes. In addition, a lack of software tools and interfaces is making it difficult to develop applications on parallel systems, he adds. Although vendors of CASE and other tools are beginning to make their products available for MPP, the market for parallel application-development toolkits remains less than bountiful.

Aronson notes that in light of the shortage of key applications for MPP systems, as well as the number of different—and confusing—architectures and standards the field currently supports, prospective adopters must carefully consider their precise needs before plunging headfirst into the technology. "The architectures haven't settled in, and you have to figure out what you're going to be doing on the parallel machine to determine what architecture would be appropriate for the kinds of problems you'll be working on. That's the real pitfall for new users." Aronson suggests that the prospective user aggressively screen MPP systems vendors to find the one that offers the best combination of hardware and software tools for his or her organization's specific needs.

Despite MPP's current shortcomings, however, Aronson believes the technology represents the next wave of large-scale computing. "The day of the large, single processor is almost

SMC introduces Fast Ethernet 10/100 Mbps.

10 times faster.

You know Ethernet is reaching its limits. You know Fast Ethernet could be the answer. But you aren't ready to implement Fast Ethernet in a significant way.

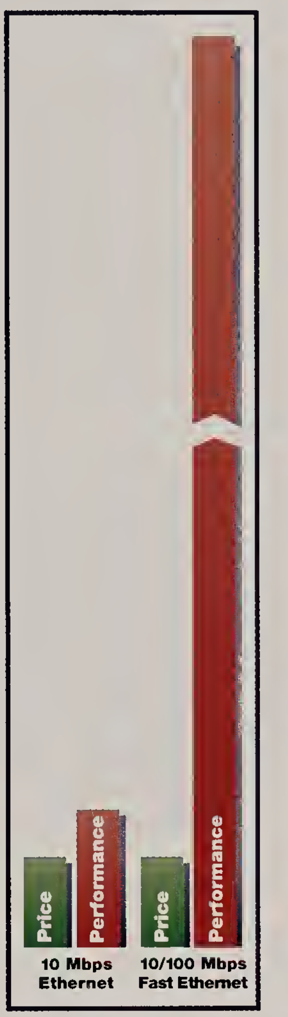
Now here comes a boatload of new users with shiny new EISA and PCI machines—and they're all asking for network connections.

So what, exactly, are you supposed to do?

Keep your options open. With Ether 10/100 and EtherPower 10/100 Mbps, the EISA and PCI Fast Ethernet cards from SMC.

SMC UNITY
LAN Access
Bandwidth Acceleration
Intranetworking

Both cards are built to run at 10 Mbps in your Ethernet environment today, and can switch to 100 Mbps Fast Ethernet mode with a simple software command.



No extra charge.

Best of all, with SMC you get the extra speed of Fast Ethernet—at little or no extra cost. Plus, all the extras that have made SMC one of the best-known names in networking—and the leader in the PCI marketplace today. A complete set of Ethernet and Fast Ethernet drivers. Backward compatibility with our PCI 10 Mbps cards. 100% compliance with IEEE 802.3, 100BASE-TX, and 10BASE-T standards. An RJ-45 connector for UTP cable—plus a DB-9 for STP, so Token Ring customers can upgrade to Fast Ethernet. And a lifetime warranty.

To future-proof your network, call 1-800-SMC-4YOU, Dept. FF23, and ask for our free Fast Ethernet tutorial and a copy of our "Networks in Transition" video.

SMC®

All trademarks and registered trademarks are the properties of their respective holders. © Copyright 1995 Standard Microsystems Corporation.

over," he says. MPP systems are particularly well-suited for running high-end decision-support tasks, such as forecasts, multiple-scenario simulations and business-process analyses, he explains. "If you have tons of processing to do, it's better to use a parallel machine and run a hundred scenarios than to use a serial machine and get maybe five done. It's a question of throughput."

Fox concurs. The researcher sees no end in sight for parallel computing, which he believes will be a major trend in the years ahead across all market segments. "Current trends strongly suggest that all computers, from personal computers to supercomputers, will become parallel computers."

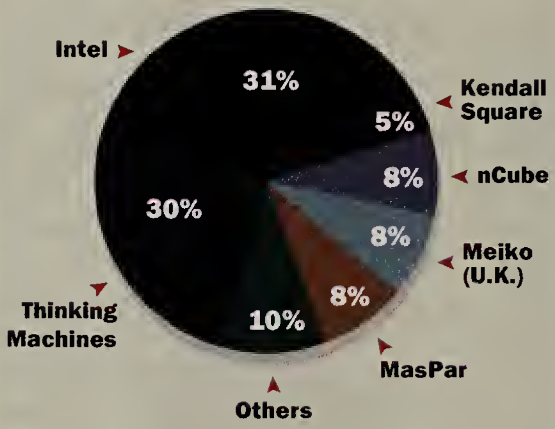
Scalability, which allows users to upgrade system performance by adding more processors, will help MPP keep pace with users' growing needs, according to Smaby. He also points out that while most people think of a move to MPP in terms of a lateral shift from a mainframe environment, more adopters are moving up to the technology from the desktop world. In addition, some mainframe "glass houses" are embracing a desktop approach to MPP, building up their massively parallel capabilities in block-like fashion. "You're beginning to see systems for middle-range applications that are scaled up from workstations or high-performance PCs," he says. "Companies are also rack-mounting tens of hundreds of processors and lashing them together with an interconnect. There are a number of different architectures emerging."

In the years ahead, Smaby sees massively parallel systems getting somewhat less massive. "The term MPP in a commercial sense is kind of a misnomer, since a lot of the systems that have evolved over the past several years aren't very massive." He notes that as microprocessors have grown more powerful, MPP system manufacturers have been able to cut down on the number of chips used in their computers while still offering impressive gains in power. "Vendors are using tens of hundreds of processors as opposed to tens of thousands or millions," he says.

But Smaby also thinks the industry's focus is gradually shifting away from how many processors can be packed into a cabinet or which company uses the most powerful processor, and toward the interconnect technology that links them all together. "The interconnect has become a far more interesting challenge for computer designers because the microprocessors now are so powerful that they have been optimized to a level that forces designers to look for other bottlenecks in the system." The relative imbalance between processor power and the rest of the system will be the focus of research for the next several years, he predicts.

Parallel Players

1993 worldwide market share for scientific high-performance parallel-processing systems, by vendor



TOTAL MARKET = $300 million

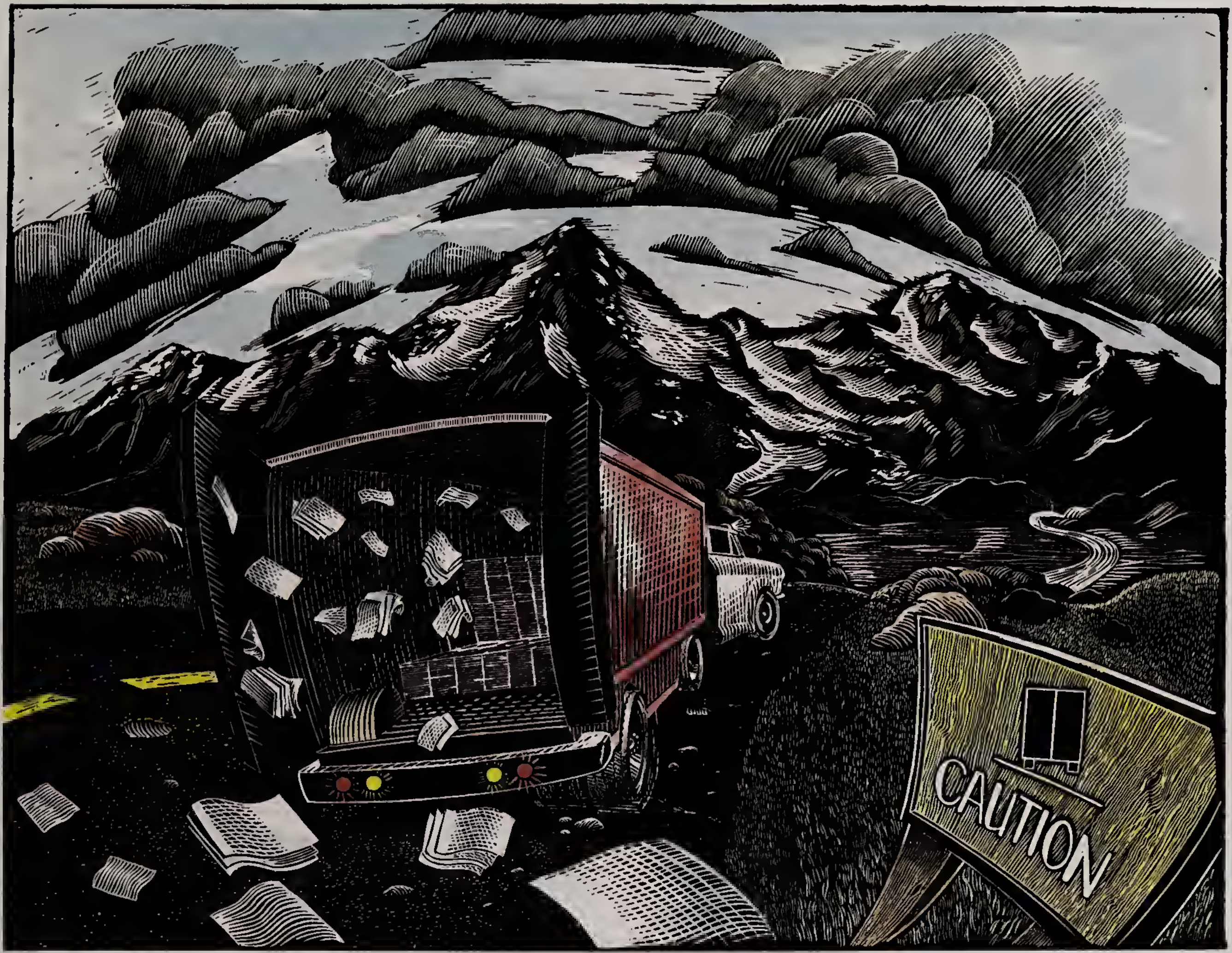
SOURCE: SMABY GROUP INC.

According to Aronson, sluggish interprocessor communication can actually cause a parallel system to slow down as additional chips are added. "I've seen situations where someone runs a simulation or forecast on a system with six processors and it works fine. He then decides to run it on eight processors and it takes longer," Aronson says. The reason for this lies in the nature of parallel computing. On a parallel system running a database application, for example, each database request is divided into several smaller subtasks that are allotted to multiple processors, thereby reducing the overall time needed to complete a query. "If you can't divide the problem or task computationally, then adding additional processors doesn't help," he explains. While parallel compilers and automatic code generators are gradually improving, it still takes a lot of manual effort to prepare code so that it can run efficiently on a parallel machine. "Typically, with most applications, a big chunk of the processors are doing nothing," says Aronson. "That's OK because processors are relatively cheap. But adding more processors won't help you in this situation and can actually slow things down."

MPP will play a major role in the emerging National Information Infrastructure (NII)—the much-vaunted "information superhighway"—by managing its networks and the enormous information repositories that will function as servers, Syracuse University's Fox predicts. "Dedicated gigabit links between supercomputers will be only one use of the NII. In addition, the NII will support many millions of 'personalized' 10-megabit-per-second streams supplying information-on-demand," he says. "Servers for video-on-demand will be classical parallel servers—whether clusters of workstations or integrated MPPs. We will have distributed clients with intelligent set-top boxes and gigaflop video games in every home.

"Soon," he adds, "every man, woman and child will come in contact with MPP on a daily basis, even if they don't know it."

John Edwards is a freelance writer based in Mt. Laurel, N.J.



Your next ride on the Info Superhighway could be the last for some of your files.

Your data delivery system demands 100% reliability. But, network timing errors can cause rejected files or corrupted data. So, smooth out the timing bumps in your packet delivery system by joining the network managers and designers who rely on Datum Inc network time servers, board-level products, and software synchronization programs.

Tap into the Global Positioning System satellite constellation to synchronize your enterprise network with millisecond-absolute timing accuracy, improved system reliability, and reduced network overhead. SNMP support improves time service and eliminates out-of-sequence time stamps. Call us today for our free, informative video presentation.

NETWORK TIME SERVERS

- ***Campus TCP/IP Sync***
- ***Netware™ LAN***

BOARD-LEVEL TIMING MODULES

- ***VME bus***
- ***SBus™***
- ***PC bus***

Datum Inc
BANCOMM DIVISION

THE MASTERS OF TIME

Datum Inc
25 years
PRECISION TIME

6541 Via del Oro • San Jose, California 95119 USA • sales@datum.com
Tel 408 578 4161 • Fax 408 578 4165 • Toll-Free in US 800 348 0648

Continued from Page 72

Hey, to tell you the truth, even *I* used to think this information-highway stuff was bunk—a place where guys who can't get a date discuss the thermal conductivity of underwear elastic. But then, of course, I got this job, and now I think the Net is the new grease of civilization.

I'm designing the congressman's Web site. I've got these cool little icons for the various topics: welfare (a poor person with her hand in a normal person's pocket); the deficit (Uncle Sam turning his pockets inside out and looking sad); taxation (Uncle Sam with his hand in a normal person's pocket); prayer in the schools (a child kneeling by her desk); the government being dismantled brick by brick (like it sounds). People click on these and get Dave's updated multimedia position statements in his own voice, and with copy by Barb, his speechwriter and former hygienist (whenever anyone says something stupid, Barb says, "Oh, rinse, please!").

Our constituents can leave a comment or click on the cybertown meeting that's always in progress. Whenever a vote is pending on the floor, we can actually tally constituent sentiment in real-time so that Dave knows exactly how the chips are falling when he votes the way Newt tells him to. And speaking of the speaker, we've got hyperlinks to NewtNet, where, if you click on the doggie icon, you can hear his mom whisper "bitch" to Connie Chung in 32-bit sound.

Newt did a lot of this in his basement in Georgetown more or less by himself. He's definitely the maximum Bill Gates of government, thinking the big thoughts and dreaming up the actual cybersolutions that will materially transform the way government works. He wanted to give poor folks tax credits for laptops. But why stop there? Let's give surplus laptops to veterans, orphans and the unemployed. I call it Dave's "Compaq With America." Let's give everybody a leg up. (The orphans especially will like the solitaire games bundled in with Windows.)

There's a lot of waste and inefficiency in government (I like to call it "white space"). We're convening a big town meeting in the cybersphere to discuss how to close up the gaps (*alt.demolish.govt*). If you think of government as a big retrograde production line that makes a product no one wants, why not eliminate the work in progress so that the factory becomes demand-driven? The high inventory in surplus regulations is a good example. The feds keep churning out these regulations that businesses hate and that just add incremental cost to goods and services while benefiting nobody but lawyers! Why can't we do this sort of thing on a just-in-time basis? When someone actually *requests* a regulation, well then go ahead and manufacture it. Otherwise, do nothing.

Once we're finished, we'll have an *entire American city* left over with which we could do something really creative.

It's so simple, you have to wonder why no one thought of it before! But that's the way it is with revolutions: They cut to the heart of the obvious by liposuctioning away all the bloated, corrupt, artery-streaking complexities that people use to justify their obsolete existences. (I stole that line from Newt.)

Mrs. S., who grew up in Minnesota, the heart of the Trotskyite Midwest, calls me a cynic. "People are going to *miss* having a government," she says. "They just don't know it yet."

"We'll still *have* a government," I answer. "But it'll be a *virtual* government."

That's the goal, at least. When I was the CIO at Threshold Industries, in Pensacola, Fla., we implemented a lights-out data center that completely automated the data-processing workload. The data-center employees hustled their buns off to get it up and running. And then they had a sad little wine-and-cheese party, after which they filed out obediently to meet with the outplacement guys.

There's no reason we can't have something approaching a lights-out government! A lot of what gets done in your typical bloated bureaucracy just amounts to moving little packets of data from one place to the next, and then back again a few times, before human error causes them to be misplaced for weeks or months or years, during which the objects to which the data apply might lose their jobs or have three more kids or move to a new state or die.

Where's the value added here? We owe it to the angry and fed-up American people to give serious consideration to rethinking the role of the entire mainframe-oriented concept of a central government. Technology gives us the unique historical opportunity to implement a client/server approach that would make distributed government and citizen empowerment a reality! And once we're finished, we'll have an *entire American city* left over with which we could do something really creative.

As one of the more out-of-the-box participants in Dave's ongoing 24x7 cybertown meeting puts it: "You could do the whole blame city as a theme park! You could put Walt Disney in charge of the place. He'd know exactly what to do with it :-)!"

So, anyway, that's what I'm doing now. Mrs. S. says she's never been more ashamed to know me. But I remain upbeat. I think that she, like most people, is just uncomfortable with change. In the end, she'll come around. In fact, we've been seeing a counselor once a week, and I'm pleased to observe an improvement already. When Dave drops by for strategy sessions, she no longer greets him by slapping his face and making fake vomiting sounds. That may not sound like a big deal, but change is an unending process of small adjustments.

I'm not sure how this bold experiment in cyberdemocracy is going to play out. But I've never felt more useful. It's such a rare thing to know with confidence that the people running the nation are in touch with the same basic values and precepts that animate your average enlightened IS group. I feel like I've been waiting all my life for this moment in history.

None of this is true. Tripp Strange is a fictitious ex-CIO and ex-consultant who is deconstructing the federal government.

I NEED HELP BUILDING MY DATA WAREHOUSE...NOW!

☐ Please send me information.

☐ CAN'T WAIT. Please have a sales representative call me ASAP.

☐ I'm planning to build a data warehouse in:
☐ 1-3 mos. ☐ 3-6 mos. ☐ 6-12 mos.

NAME TITLE/DEPT.

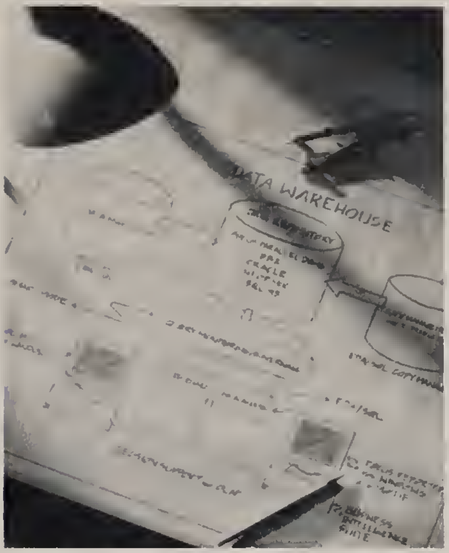
COMPANY

ADDRESS

CITY STATE ZIP

( )
TELEPHONE

Printed in USA
CIO 495



Information Builders

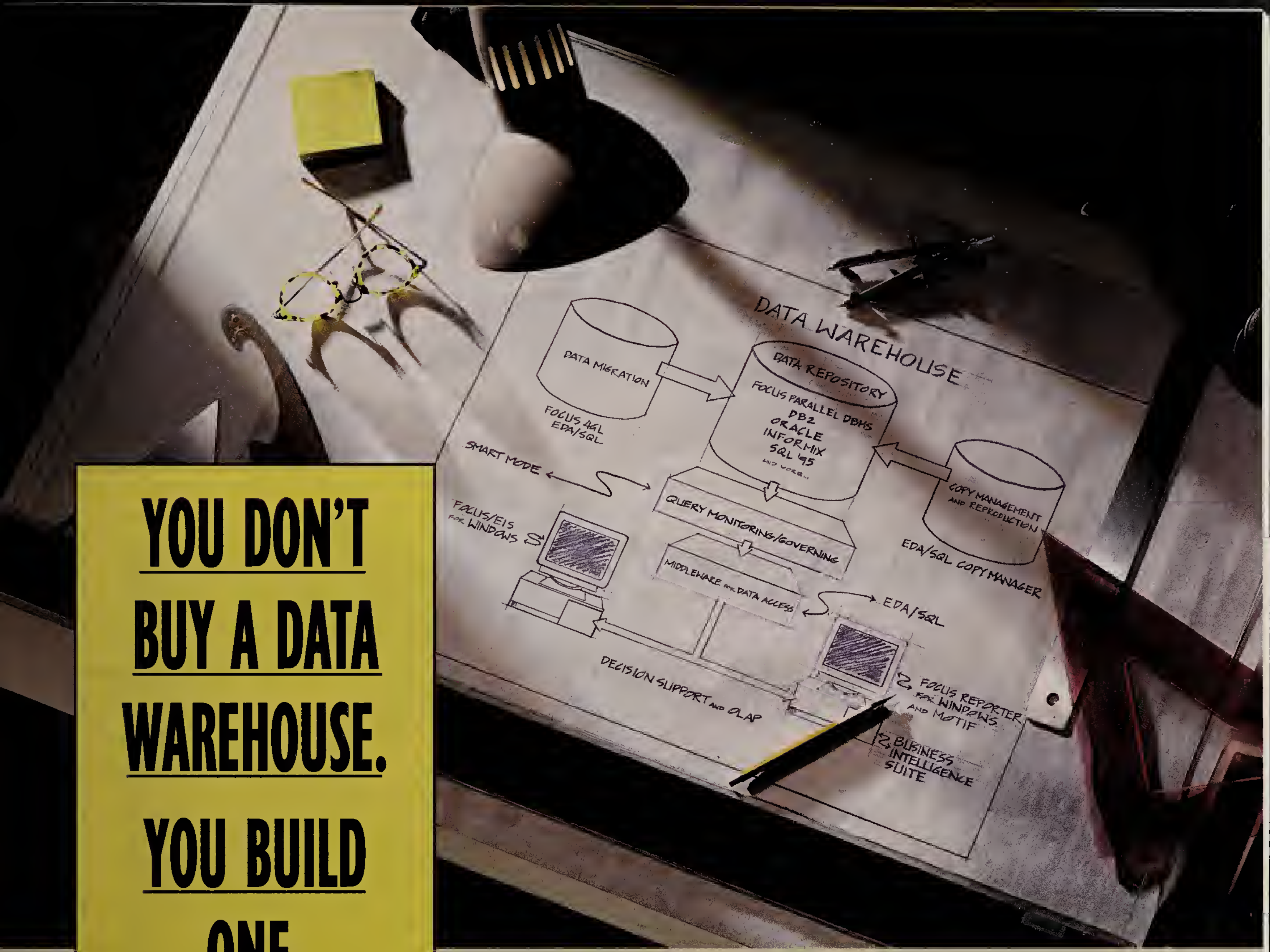
CALL 800-969-INFO
In Canada call 416-364-2760

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 1305 NEW YORK, NY

POSTAGE WILL BE PAID BY ADDRESSEE

ATTN: Product Information Center
Information Builders
P.O. Box 1461
New York, NY 10117-1484


DATA WAREHOUSE
DATA MIGRATION
FOCUS 4GL
EDA/SQL
DATA REPOSITORY
FOCUS PARALLEL DBMS
DB2
ORACLE
INFORMIX
SQL '95
AND MORE...
COPY MANAGEMENT AND REPRODUCTION
EDA/SQL COPY MANAGER
SMART MODE
FOCUS/EIS FOR WINDOWS
QUERY MONITORING/GOVERNING
MIDDLEWARE FOR DATA ACCESS
EDA/SQL
DECISION SUPPORT AND OLAP
FOCUS REPORTER FOR WINDOWS AND MOTIF
BUSINESS INTELLIGENCE SUITE

YOU DON'T BUY A DATA WAREHOUSE. YOU BUILD ONE.

Creating a data warehouse is like building a new home on unchartered territory... you don't know what you're getting into until you start digging the foundation. But you can greatly increase your chances for success by following a few basic rules.

RULE #1: HIRE AN EXPERIENCED ARCHITECT

Data warehousing is simply a new name for accessing, migrating, and staging data for optimum decision support applications...all the things Information Builders has been doing longer and better than any other software/consulting firm in the industry. Our experienced staff of professionals provide complete consulting, planning, implementation and training from more than 35 offices in North America.

RULE #2: LEARN BEFORE YOU DESIGN

Why attempt to restage and restructure data until you learn how it's going to be utilized by end users? Information Builders' EDA/SQL® middleware technology offers your users transparent access to virtually any database on any computer platform. Once they have access to the data, you can analyze how they use it and pinpoint any potential problems. And with our EDA/SQL SmartMode™ system, you can monitor all database activities so you can develop your most important resources first, design systems that make sense, and enjoy immediate benefits. Best of all, EDA/SQL can extend data access beyond your warehouse database, transforming your entire enterprise into a "Virtual Data Warehouse."

RULE #3: USE THE BEST TOOLS

Thousands of the world's leading corporations use Information Builders' FOCUS 4GL for data migration and staging on more than 35 computer platforms. Our EDA/SQL Copy Manager lets you replicate data from over 60 databases and EDA/SQL Catalog Manager makes managing meta data easier than ever before. Most importantly of all, our FOCUS Reporter for Windows and FOCUS SMP (Simultaneous Parallel Processing) provide a level of performance for client/server reporting and decision support simply not available with today's relational tools.

RULE #4: START ASKING QUESTIONS AND YOU'LL START GETTING ANSWERS!

If a data warehouse strategy is in your future, contact your local Information Builders branch office or call us. We'll answer your questions, register you for our FREE Data Warehouse seminar, or set up an appointment for a consultation and evaluation. **1-800-969-INFO.** In Canada call 416-364-2760.

Information Builders

FOCUS and EDA/SQL® are trademarks of Information Builders, Inc., NY, NY, 212-736-4433 INFO@IBI.COM

CIO

INDEX

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

AT&T ... 14, 42
America Online ... 42
Andersen Consulting ... 32, 42
Arthur Andersen & Co. ... 42
Banyan Systems Inc. ... 42
Bay Networks ... 42
Black & Veatch ... 32
CSC Research and Advisory Services ... 28
Chevron USA Products Co. ... 32
Chrysler Corp. ... 54
Coleman & Associates Inc. ... 14
Comdisco Inc. ... 14
Communications Workers of America ... 54
Coopers & Lybrand ... 14
Delphi Consulting Group Inc. ... 32
Desktop Videoconferencing Conference ... 14
Diamond Communications ... 42
Digital Equipment Corp. ... 32
Documentum Inc. ... 32
Eastman Kodak ... 32
Excalibur Technologies Corp. ... 32
Gartner Group ... 24, 62
General Motors Corp. ... 54
Glaxo Inc. ... 32
Graphics Communications International Union ... 54
Harvard Business School Publishing ... 14
IBM Corp. ... 14, 32, 42
Input Inc. ... 14
Intel Corp. ... 62
Interleaf Inc. ... 32
International Data Corp. ... 32
International Data Group ... 14
Kendall Square Research Corp. ... 62
META Group Inc. ... 32
Mandel Co. ... 54
MasPar Computer Corp. ... 62
McDonald's Corp. ... 14
Meiko ... 62
Microsoft Corp. ... 24
Milwaukee Graphics Arts Institute ... 54
Nature Conservancy, The ... 42
nCube ... 62
New England Shelter for Homeless Veterans ... 42
New England Systems Technology Inc. ... 42
Novell Inc. ... 32
Oracle Corp. ... 62
PC DOCs Inc. ... 32
Pacific Bell ... 54
Palindrome Corp. ... 14
Powersoft Corp. ... 42
Printing Industries of Wisconsin ... 54
Racal-Datacom Inc. ... 42
Revelation Technologies Inc. ... 42
S.M. Stoller Corp. ... 32
Salvation Army, The ... 42
Saros Corp. ... 32
Smaby Group Inc. ... 62
Standish Group International Inc., The ... 14
Summit Strategies Inc. ... 14
Surety Technologies ... 14
Sybase ... 42
Thinking Machines Corp. ... 62
Tiffany Co. ... 42
United Auto Workers ... 54
ViewStar Corp. ... 32
Watcom International ... 42
WordPerfect Corp. ... 32
World Bank, The ... 32
Xerox Corp. ... 32, 54
Xsoft ... 32

Advertiser Index

AT&T ... 35
Andersen Consulting ... 29
Ascom Timeplex ... 23
CIO Communications Inc. ... 20A, 21
Canon USA Inc. ... 41
Computer Associates Intl. Inc. ... 2
Computron Technologies Corp. ... C3
DCI (Regional) ... 71
Data General Corp. ... 11
Datum Inc. ... 67
EMC Corp. ... 9
Ernst & Young ... 52
Hyperion Software ... 25
IBM Corp. ... 31, 46
Information Builders Inc. ... 69
Informix Software Inc. ... 7
Isogon Corp. ... 15
Lanier Worldwide Inc. ... 63
Mercury Interactive Corp. ... 59
Micro Focus ... C4
Minolta Corp. ... 49
Mitel Inc. ... 51
Progress Software Corp. ... 4
SAS Institute Inc. ... 17
Software Spectrum ... 61
Southwestern Bell (Regional) ... 71
Standard Microsystems ... 65
Sun Microsystems Inc. ... 12
Texas Instruments ... 18
Unisys Corp. ... C2

Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published semimonthly; monthly in July and August; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1995 by CIO Communications Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: ‡. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208. CIO is free to qualified information executives. To all others the one-year basic rate is $98 for U.S. and Canada, $185 to foreign countries (payable in U.S. funds only). The single copy price is $7. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 872-0618. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

CIO Sales Offices

President and Publisher
JOSEPH L. LEVY
508 935-4601

Senior VP/Sales
MICHAEL J. MASTERS
201 244-5510

List Services Manager
STEPHANIE LEGELIS
508 935-4433

List Services Assistant
KATE DAVEY
508 935-4072

CIO Communications Inc.
492 Old Connecticut Path
PO Box 9208
Framingham, MA 01701-9208
508 872-0080, FAX 508 872-0618

EAST COAST/NORTH CENTRAL

Regional Director/Advertising Sales
FRANK S. GENOVESE
201 244-5505

District Manager/Advertising Sales
EILEEN TRAPP HENKE
201 244-5507

Account Executive
KIRSTIN L. PIHL
201 244-5511

Advertising Sales Associate
MARLENE M. LEVIS

CIO Communications Inc.
30 Two Bridges Road, Suite 110
Fairfield, NJ 07004
201 227-1140, FAX 201 227-1565

NEW ENGLAND

Regional Director/Advertising Sales
LINDA L. BURTON
508 935-4039

Advertising Sales Associate
CAROLYN S. CLARK
508 935-4092

CIO Communications Inc.
492 Old Connecticut Path
PO Box 9208
Framingham, MA 01701-9208
508 872-0080, FAX 508 872-0618

SOUTH CENTRAL/EASTERN CANADA

Regional Manager/Advertising Sales
ROBERT E. SAWDON

Advertising Sales Associate
DEBBIE LIVELY

CIO Communications Inc.
5495 Beltline Road, Suite 240
Dallas, TX 75240
214 239-5736, FAX 214 239-5734

WEST COAST/WESTERN CANADA

Regional Director/Advertising Sales
GERALD E. PARSONS
415 693-1987

Regional Manager/Advertising Sales
RICHARD BASTAS
415 693-1988

Advertising Sales Associate
JOCELYN D. ERTEL

CIO Communications Inc.
220 Montgomery Street, Suite 1120
San Francisco, CA 94104
415 398-8200, FAX 415 398-4649

CIO is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 200 computer publications in 63 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA'S** Computerworld Argentina, Infoworld Argentina; **AUSTRALIA'S** Computerworld Australia, Australian PC World, Australian Macworld, Network World, Mobile Business Australia, Publish!, Reseller, IDG Sources; **AUSTRIA'S** Computerwelt Oesterreich, PC Test; **BELGIUM'S** Data News (CW); **BOLIVIA'S** Computerworld; **BRAZIL'S** Computerworld, Gamepro, Game Power, Mundo Unix, PC World, Publish, Super Game; **BULGARIA'S** Computerworld Bulgaria, Ediworld, PC & Mac World Bulgaria, Network World Bulgaria; **CANADA'S** CIO Canada, Computerworld Canada, Graduate Computerworld, InfoCanada, Network World Canada, Reseller; **CHILE'S** Computerworld Chile, Informatica; **COLOMBIA'S** Computerworld Colombia, PC World; **COSTA RICA'S** PC World; **CZECH REPUBLIC'S** Computerworld, Elektronika, Macworld, PC World; **DENMARK'S** Communications World, Computerworld Danmark, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Tech World, Windows World; **ECUADOR'S** PC World Ecuador; **EGYPT'S** Computerworld (CW) Middle East, PC World Middle East; FINLAND'S MikroPC, Tietoviikko, Tietoverkko; **FRANCE'S** Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; **GERMANY'S** Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Electronic Entertainment, Gamepro, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unit; **GREECE'S** Infoworld, PC Games; **HONG KONG'S** Computerworld Hong Kong, PC World Hong Kong; **HUNGARY'S** Computerworld SZT, PC World; **INDIA'S** Computers & Communications; **INDONESIA'S** Info Komputer; **IRELAND'S** ComputerScope; **ISRAEL'S** Computerworld Israel, PC World Israel; **ITALY'S** Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC Shopping Italy, PC World Italia; **JAPAN'S** Computerworld Today, Information Systems World, Macworld Japan, Nikkei Personal Computing, SunWorld Japan, Windows World; **KENYA'S** East African Computer News; **KOREA'S** Computerworld Korea, Macworld Korea, PC World Korea; **LATIN AMERICA'S** GamePro; **MALAYSIA'S** Computerworld Malaysia, PC World Malaysia; **MEXICO'S** Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; **THE NETHERLANDS'** Computer! Totaal, Computable (CW), LAN Magazine, MacWorld, Totaal "Windows"; **NEW ZEALAND'S** Computer Listings, Computerworld New Zealand, Network World, New Zealand PC World; **NIGERIA'S** PC World Africa; **NORWAY'S** Computerworld Norge, C/World, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Produktguide, Publish& Multimedia World, Student Data, Unix World, Windowsworld; IDG Direct Response; **PAKISTAN'S** PC World Pakistan; **PANAMA'S** PC World Panama; **PERU'S** Computerworld Peru, PC World; **PEOPLE'S REPUBLIC OF CHINA'S** China Computerworld, China Infoworld, China PC & Communications Magazine, Computer Fan, PC World China, Electronics International, Electronics Today/Multimedia World, Electronic Product World, China Network World, Software World Magazine, Telecom Product World; **PHILIPPINES'** Computerworld Philippines, PC Digest (PCW); **POLAND'S** Computerworld Poland, PC World/Komputer; **PORTUGAL'S** Cerebro/PC World, Correio Informatico/Computerworld, MacIn; **ROMANIA'S** Computerworld, PC World, Telecom Romania; **RUSSIA'S** Computerworld-Moscow, Mir - PK (PCW), Sety (Networks); **SINGAPORE'S** Computerworld Southeast Asia, PC World Singapore; **SLOVENIA'S** Monitor Magazine; **SOUTH AFRICA'S** Computer Mail (CIO),Computing S.A., Network World S.A., Software World; **SPAIN'S** Advanced Systems, Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NeXTWORLD, Super Juegos Magazine (GamePro), PC World Espana, Publish; **SWEDEN'S** Attack, ComputerSweden, Corporate Computing, Macworld, Mikrodatorn, Natverk & Kommunikation, PC World, Publishing & Design (CAP), DataIngenjoren, Maxi Data,Windows World; **SWITZERLAND'S** Computerworld Schweiz, Macworld Schweiz, PC Tip; **TAIWAN'S** Computerworld Taiwan, PC World Taiwan; **THAILAND'S** Thai Computerworld; **TURKEY'S** Computerworld Monitor, Macworld Turkiye, PC World Turkiye; **UKRAINE'S** Computerworld; **UNITED KINGDOM'S** Computing /Computerworld, Connexion/Network World, Lotus Magazine, Macworld, Open Computing/Sunworld; **UNITED STATES'** Advanced Systems, AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Digital Video, DOS Resource Guide, Electronic Entertainment Magazine (E2), Federal Computer Week, GamePro, IDG Books, Infoworld, Laser Event, Macworld, Multimedia World, Network World, PC Letter, PC World, PlayRight, Power PC World, Publish, SWATPro, Video Event; **VENEZUELA'S** Computerworld Venezuela, PC World Venezuela; **VIETNAM'S** PC World Vietnam.

MONTEREY, CA · MAY 16–17, 1995

DEVELOPING AN Outsourcing Strategy

SUCCESS FACTORS FOR IT AND BUSINESS SOURCING

Call (508) 470-3880 to Receive Complete Conference Information. Mention Priority Code HBEJF02.

Featuring More Than 30 Outsourcing Experts!

Bruce Allen, Conference Chairman, Vice-President, The META Group
Dale Kutnick, Co-Chairman, President, The META Group
Rita Terdiman, Vice-President, The Gartner Group
Bob McNulty, CIO, Digital Equipment Corporation
Ernest P. Rogers, CIO, Mutual of New York
Dennis Wayson, Director, Dataquest
William Y. Tauscher, CEO, Vanstar Corporation

Sponsored by

DCI

Co-Sponsored by

Litton Computer Services
acs Affiliated Computer Services, Inc.
HEWLETT PACKARD
CONCERT Global Communications from BT and MCI
ISSC
digital™
CSC
Vanstar The Technology Services Company
olivetti
Coopers &Lybrand

Mr. Tripp Goes To Washington

Where he learns that, when it comes to reinventing government, there's the right way, the wrong way, the Beltway and the info highway

BY TRIPP STRANGE

Mrs. Strange celebrated the most recent watershed New Year by loading up the utility/sport vehicle with cartons of my musty spreadsheet data ("You never throw anything away!"), cases of empty Lake Minnehaha sparkling-water bottles, and a dozen cordovan, light-coral and bee-yellow size 44-long sportcoats. She lit out for the dump—a traditional Midwest cleansing ritual in which, instead of setting possessions ablaze in a rousing potlatch, the townspeople avidly pick over each other's leavings, pretending briefly to really want them.

How was Mrs. S. to know that while the atavistic V-8 engine idled and Walt the Dump Guy helped her choose a particular recycling bin from the profusion of highly specialized options, I would receive a phone call (Bowl Game Interruptus!) from the corridors of power, and that it would change my life in (as Mrs. S. puts it) "odd and unpredictably vile ways"?

And now I have to pinch myself upon awakening each morning. I am inside the fabled Beltway, America's newest dream destination (now that all the tax-and-spend liberal crumbums have been expelled). I am suddenly the top IT adviser (some might say *guru* or, better yet, *revolutionary*) to the powerful chairman of the ultrapowerful House Subcommittee on Empowerment and Personal Responsibility. (Only three years ago he was an orthodontist who had never even registered to vote, and now he's a key citizen legislator!)

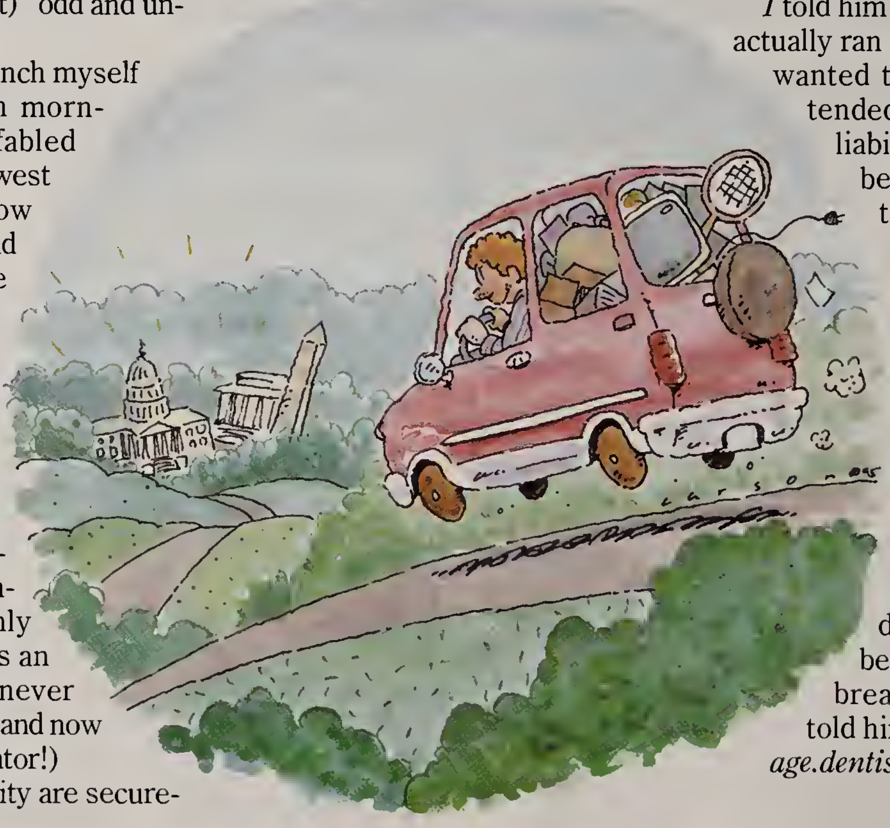


ILLUSTRATION BY JIM CARSON

We in the new majority are securely in charge of trying to reengineer the nation. Apparently, the prospect of people like me duplicating in government what we once did for mediocre midsized rust-belt corporations excites America no end.

What is our program, exactly? Well, when Rep. Dave (my former tooth-straightener) appeared with Newt on Brinkley just last week, he summed it up like this: "We're doing exactly what the normal, ordinary American people want us to do. Which is, they want us to demolish the federal government as we know it and replace it with an interactive kiosk hooked up to a Unix Web server padlocked in a shed behind the Chuck E. Cheese in Rockville, Md. And the reason we know this is because we're in constant touch with these normal, ordinary, straight-toothed citizens through our e-mail address on the information superhighway!"

I told him to say all that stuff. Dave actually ran for Congress because he wanted to set a cap (no pun intended) on dental-malpractice liability amounts. But he's becoming interested in all the other issues, too—like getting out of the U.N. and stopping federal funding for public TV so that the cable companies can finally have a level playing field. But he's really shot up on the infobahn. You can find him most nights haunting raunchy Usenet chat groups under various naughty cybernyms. It wasn't easy to break him in; but when we told him about *alt.fan.sex.bondage.dentists,* he perked right up!

Continued on Page 68

I Want a Proven Winner For My Client/Server Financial Needs.

☐ Please send your white paper, "Financial Software & Beyond".
☐ Please send information about your workflow solutions.
☐ Please call.

NAME TITLE

COMPANY

ADDRESS STATE ZIP

PHONE

computron

CLIENT/SERVER INNOVATION...NOT JUST A PLATFORM CHANGE

800-828-7660

CIO 495

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 4 RUTHERFORD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

computron
Meadows Office Complex
301 Route 17 North
Rutherford, New Jersey 07070-9860

Don't Gamble When Choosing Client/Server Financial Software.

Go With A Proven Winner...Computron.

That's what Pfizer did, because smart companies don't take unnecessary risks. Like many worldclass corporations, they chose Computron for their enterprise-wide client/server financial/accounting system.

Pfizer, a world leader in healthcare, is using Computron's scalable 3-tier architecture on a SUN/Oracle platform to support thousands of users. And they're using Computron's integrated workflow and COOL to implement their vision of accounting as action management instead of fixed-point scorekeeping.

Innovation With High-End Functionality

Pfizer picked Computron because they know that high performance client/server software needs to be more than just a platform change of 1970s-style accounting with a relational database and a pretty GUI.

Systems for the 90s must transform finance into enterprise-wide information and action systems, where users can access financial and even unstructured off-line data for decision support in ways that are effective and meaningful to them.

Computron does this by combining innovative technology with proven high-end international functionality, advanced GUI tools, and a truly open 2nd generation architecture that scales up and delivers, regardless of platform, database, or desktop client type.

Architecture With Vision

Computron was the first to innovate with workflow/imaging and COOL technology as an integral part of its architecture that can surround and connect your other systems to provide a new processing dimension... not just workflow-enabled accounting.

Since 1993, IDC shows Computron as one of the top five worldwide client/server financial vendors. So before you bet everything on a big name, learn the facts about a worldclass client/server company.

Call to receive more information and our free white paper titled "Client/Server and Beyond".

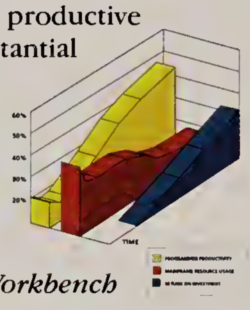
computron 800-828-7660

CLIENT/SERVER INNOVATION... NOT JUST A PLATFORM CHANGE

ATLANTA • BOSTON • CHICAGO • HOUSTON • LOS ANGELES • NEW YORK • WASHINGTON • HONG KONG • JAKARTA • LONDON • MELBOURNE • SINGAPORE • SYDNEY • TORONTO

1 REHOST YOUR DEVELOPERS

Take your host developers to the workstation with Micro Focus. We've got products that provide a mainframe development environment for the PC and a whole lot more. Our solution makes your developers more productive and brings about substantial savings in TSO costs. It also delivers quality applications on time, for production back on the host.



Making the case for Workbench

2 REHOST YOUR APPLICATIONS

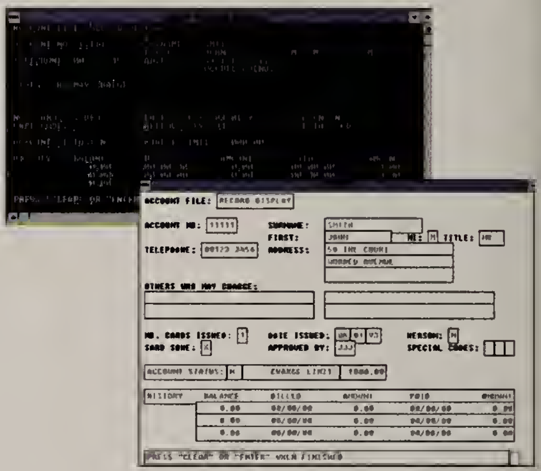
You're telling us that you want to rehost your applications off the mainframe. From Step 1 your developers are already rehosted, as are your applications during development and testing. We've got all the products and services for you to take the next step to keep your applications on the new platform for production as well. With Micro Focus there are no compromises when it comes to the production level of reliability and integrity that your enterprise has come to rely on.

3 CLIENT/SERVER AT YOUR PACE

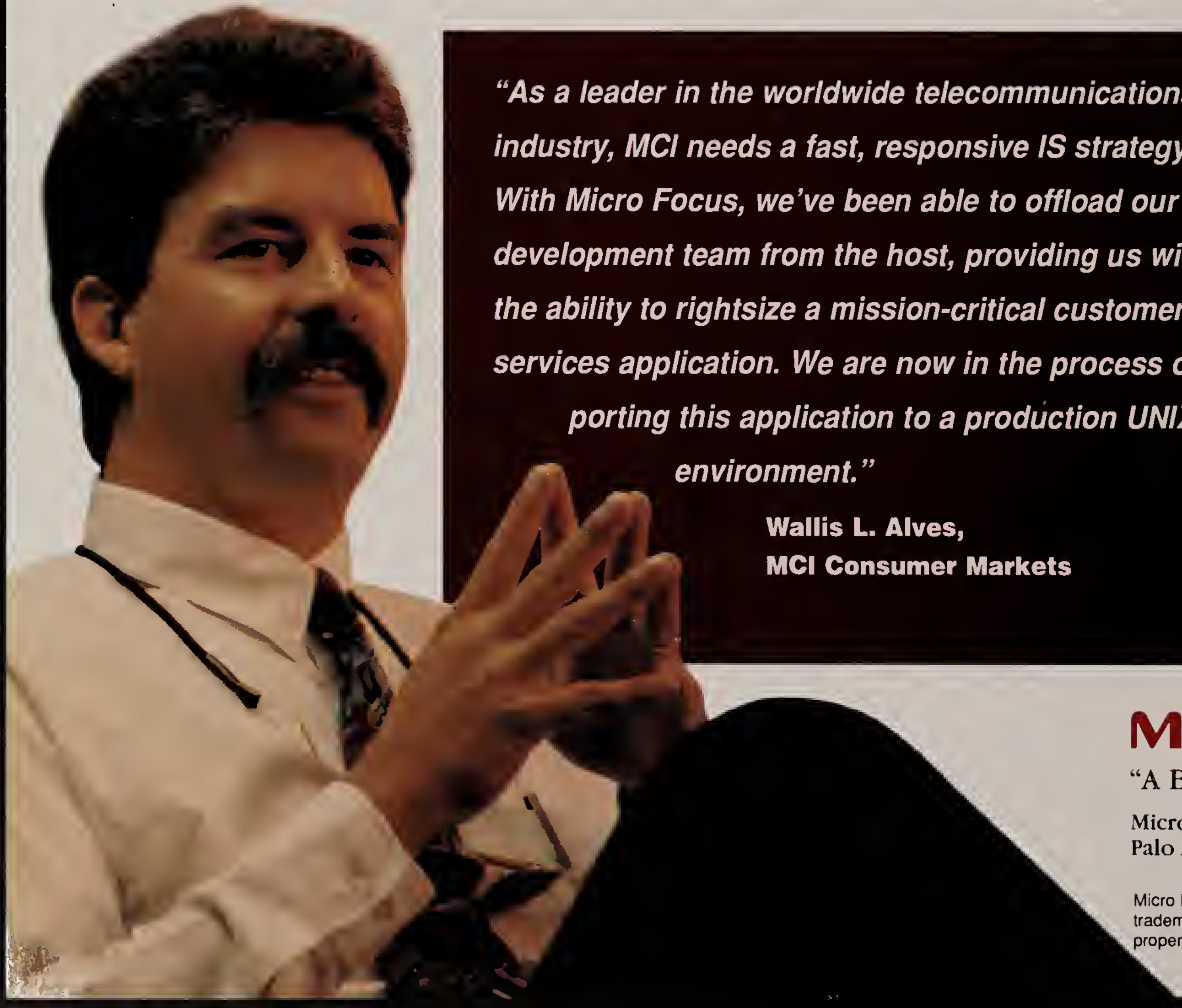
So now that your developers have become PC experts and your applications are running off the host, you're in a great position to fully exploit the new platform. With the Micro Focus Client/Server solution, you can evolve to the new paradigms including graphical user interfaces and object orientation. Re-architect your applications at your own pace by moving interfaces, transactions and data seamlessly between your chosen Client and Server platforms.

THREE STEPS THAT WILL TAKE YOUR ENTERPRISE INTO THE FUTURE

ENTERPRISE APPLICATIONS TO NEW AGE CLIENT/SERVER



Micro Focus Dialog System™ provides facilities to automatically generate graphical user interfaces from existing character-based mainframe screen sets.



> *"As a leader in the worldwide telecommunications industry, MCI needs a fast, responsive IS strategy. With Micro Focus, we've been able to offload our development team from the host, providing us with the ability to rightsize a mission-critical customer services application. We are now in the process of porting this application to a production UNIX® environment."*
>
> **Wallis L. Alves,**
> **MCI Consumer Markets**

Take Steps 1, 2 and 3 at your own pace assured that you'll be leveraging your assets in people, data and code. With Micro Focus, the systems you build for today's business will have the momentum to carry you forward to meet tomorrow's requirements as well.

Take the first step today, call 1-800-MF-COBOL Extn 1209 to receive a copy of "The Changing World of Business Computing 95" and see how others have moved one step closer to the future.

MICRO FOCUS

"A Better Way of Programming"

Micro Focus Inc., 2465 East Bayshore Road,
Palo Alto, CA 94303, Tel (415) 856 4161

Micro Focus is a registered trademark, Dialog System is a trademark of Micro Focus Inc. All other trademarks are the property of their respective companies.

CONGRATULATIONS TO LAST YEAR'S WINNERS

APCOA, INC.

Paul R. Langes
Director, Systems & Technology

G. Walter Stuelpe, Jr.
President & CEO

CATERPILLAR

Robert J. Hoffer
Information Services Manager
Engine Division

George E. Curry
Customer Services Manager
Engine Division

THE COMMONWEALTH OF MASSACHUSETTS

John Thomas Flynn
Chief Information Officer

William Kilmartin
Comptroller

HYATT HOTELS & RESORTS

Gordon S. Kerr
Senior Vice President of MIS

John W. Biggs
COO of Regency Systems Solutions

KMART CORPORATION

David M. Carlson
Senior Vice President
of Corporate Information Systems

David Wegscheid
Divisional Vice President
of Merchandising

PCs COMPLEAT

William C. Brown
Executive Vice President

Gordon B. Hoffstein
Chairman & CEO

Announcing the Enterprise Value Awards

Honoring executives who craft
innovative information technology solutions
to enhance business value

SPONSORED BY

CIO

CIO COMMUNICATIONS INC.